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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS
FOR BLIND WORKERS

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FEDERAL SECURITY AGENCY
Office of Vocational Rehabilitation
Washington 25, D. C.

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HANDBOOK OF REPRESENTATIVE INDUSTRIAL JOBS
FOR BLIND WORKERS

Introduction

For many years blind persons have been employed in various types of industrial jobs. When federal funds first became available to State Agencies for the Blind in 1943, the rehabilitation program for blind persons was given considerable impetus.

Prior to the war the range of jobs performed by persons without sight was extremely limited. The war years and the resultant urgent need of manpower gave the blind an opportunity to perform a greater variety of jobs and demonstrate their ability to excel where their skills and job requirements were properly matched. Becoming acquainted with these many new types of jobs has stimulated an even greater variety of job opportunities for the blind.

This Handbook has been developed to meet expressed needs and for the purpose of giving added stimulus to the search for additional opportunities for the blind. Although it is primarily intended for the use of Industrial Employment Counselors working with blind persons, it may also be of value to Rehabilitation Counselors and other individuals engaged in work with the blind.

It is the purpose of this Handbook to: (1) serve as a guide to the Industrial Employment Counselor in surveying, analyzing, and recording information about jobs suitable for blind persons; (2) acquaint the Industrial Employment Counselor with the wide range of industrial operations which can be performed without sight; (3) inform Industrial Employment Counselors of the industries in which these industrial jobs are to be found and identify the factors and conditions which should be taken into consideration when selecting a job for a blind individual.

One of the objectives in making a plant survey is to select those jobs in which the tasks and operations are such

that they can be performed successfully without the use of sight. The Industrial Employment Counselor should avoid the selection of jobs which require modification of tasks to accommodate blind persons unless such changes are of equal value to both blind and sighted employees.

It should be clearly understood that a job for a particular client should not be selected only on the basis of the job specification included in this Handbook. A survey including trial and appraisal of each job must be made in the factory before it can be ascertained with certainty that the job selected is suitable for a particular individual. This procedure must be followed because of the variations between factories. At no time should this Handbook or individual job specifications be used as a display item by the Industrial Employment Counselor in his contacts with an employer or his personnel. Job specifications are prepared in order that information may be available regarding jobs which are likely to be found in a particular plant. They are not evidence that a particular job in a specific plant will be suitable for a particular blind person.

For convenience and simplicity in use, the Handbook is divided into three parts. Part I--Specific Industry Series deals with the types of jobs which are peculiar to a particular industry. Part II--General Coverage Series deals with jobs found in substantially the same form in many industries. Part III--An explanation of "How to make a physical demands analysis of a job with special treatment of the problems involved in doing the job without the use of sight."

There are also included Appendices covering: A--Definitions of terms used in the Handbook: B--Physical Demands Form E.S.-130: C--Definitions of Physical Demands Terms (Physical Activities Terms and Working Conditions Terms) as found in Form E.S.-130.

These materials were prepared by the Services for the Blind Branch under the direction of Mr. Joseph F. Clunk. We wish to acknowledge the assistance of the United States Employment Service of the Department of Labor in giving permission to quote from the Dictionary of Occupational Titles and National Physical Demands Information Series. The Occupational Analysis and the Counseling, Selective Placement and Testing Branch made valuable suggestions on the general content and the method of presenting the material included in this Handbook.

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Part I

Specific Industry Series

Each specific industry series of job specifications is set up with jobs which are peculiar to a specific industry. Generally these jobs will not be found outside the specific industry being described. Examples of industries falling in the specific series are laundry and dry cleaning, bakeries, automotive service, ceramics, etc.

The Information Sheet for each category of industry for which job specifications have been prepared contains: a general statement of the category, its distribution throughout the country, types of workers usually employed on these jobs, working conditions in the industry, safety precautions, health conditions, dangers encountered, jobs in the industry usually found suitable for blind workers and for which job specifications are included in these materials, examples of combinations of jobs which add up to total employment for a blind worker, and types of jobs which should be avoided even though they may at first appear to be feasible.

Individual job specifications are included in each category. Each contains the following information: the name of the operation and the item(s) worked on in the plant surveyed; the job title; alternate title; general description and code number--USES Dictionary of Occupational Titles; skill required; worker characteristics--mental and physical, physical demands; work steps as observed for the position in a particular factory; data on equipment used including name and description, set-up and maintenance required, and by whom this service is provided; training procedures including pre-employment and on-the-job training; deviations or additions suggested for training the blind; relation of this job to others and teaming with other workers; modification, deviation and special tools required by a blind worker; minimum sight required for the performance of the job under most favorable circumstances and conditions, which should be checked before declaring the job suitable; conditions usually to be avoided; other jobs with which to combine in order to provide total employment.

Materials will be released as circumstances permit for these and other categories.

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***Note on Marking of Pages:**

In Parts I and II, each page number has three marks of identification: The first consists of two capital letters (either SI for Specific Industry or GC for General Coverage). The second and third are arabic numerals, separated from each other and the preceding letters by hyphens. (Examples: GC-1-16; SI-3-6.) The first arabic numeral indicates the number of the category. The second indicates the page number within the category. In this connection, it should be noted that not all editions of the Handbook have had the same page numbering within the category, although all editions have followed the same numbering of categories. Pages of Part III are not numbered by the system just described, but by simple arabic numerals.

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SPECIFIC INDUSTRY SERIES

Category SI-1

LAUNDRY AND DRY CLEANING

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LAUNDRY AND DRY CLEANING

General Information Sheet

Character of Industry: The industry does washing, drying, and ironing of garments and other items, and dry-cleaning and pressing of clothing. Different laundries or departments within a laundry may be organized to handle family bundles, and/or washing from business organizations such as hotels, restaurants, barber shops, and linen supply companies. Hotels, large business organizations and institutions often operate their own laundries. Dry cleaning and pressing work may be done by one organization dealing direct with the customer, or may be organized on a wholesale basis doing the work for other companies; pick-up and delivery companies sometimes do their own pressing and have the garments cleaned by a wholesaler.

Distribution of Industry: All forms of this laundry are found throughout the country; one company may have several departments, each representing one of the above categories.

Type of Worker Usually Employed: A large portion of the jobs in this industry have been filled by women. Many of the tasks are arduous and require more than usual stamina. In some sections of the country colored help is used exclusively.

Working Conditions: Surroundings are usually hot and damp. Day shifts only. Pay is low to medium. Employment steady, with some areas closely unionized.

Safety Precautions, Health Conditions, Hazards: Most equipment is well designed for safety in operation. Health may be affected by high temperatures and humidity. In pressing departments good orientation and care are required to avoid burns.

General Coverage Jobs Pertinent: Carton Set-up, G C-1; Wrapping and Packaging, G C-2; Material Handling, G C-3.

General Information Sheet (Contd.)

Combination Employment: (Jobs often combined for full-time employment)

- A. Flatwork ironer; shake-out; folder; shirt folder.
- B. Bundle wrapper; bundle tier; carton former; former.
- C. Loader and puller (wash wheel); extractor man.

Jobs Usually to be Avoided Although Seemingly Suitable: Sorting, wrapping family bundles, shirt pressing, boxing shirts, flatwork catcher, folding.

LAUNDRY AND DRY CLEANING

EXTRACTOR MAN

1. Name used for Position in Plant Surveyed: Extractor Man (Laund. Ind.) (Also any Ind.)

D.O.T. Title: Extractor Operator I, a Laborer Process.

Code: 9-57.21

Alternate Titles: Centrifugal extractor operator; cleaner; clothes wringer; drying machine tender; drying room man; extractor, extractor girl or man; extractor hand; extractor machine operator; extract or tender; rapid extractor operator; whiz man; whiz operator; whizzer; whizzer hand; wizard drier operator; wringer; wringer man.

D.O.T. Definition: Extractor Operator (1) (any ind.). A Laborer Process. Removes surplus moisture from materials (such as wet cloth, clothing, knit goods, or yarn) by operating a centrifugal extractor (m); loads material into perforated drum of machine; may use chain hoist; closes lid and starts machine, allowing it to run until fluid stops flowing from drain; removes partly dried material.

Items Worked on in Plant Surveyed: Wet laundry

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, moderate physical ability and endurance; average mental ability.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, carrying, pushing, pulling, handling, talking, hearing.

b. Working Conditions: Inside, hot, humid, wet, dirty, noisy, adequate lighting, adequate ventilation, vibration, mechanical hazards, moving objects, working around others.

c. Skill Required: Unskilled. Develops sufficient skill to uniformly distribute the load in the basket in such a way that it is in balance when extractor is running. This is judged mostly by the feeling of the way materials are packed into the basket.

LAUNDRY AND DRY CLEANING

EXTRACTOR MAN (Contd.)

4. Details of Physical Activities: Stands, turns, stoops slightly, and reaches out with both hands to grasp and lift bundles weighing approximately 15 to 40 lbs. Carries them approximately 5 ft. or less from hand truck to machine. Grasps rammer and pushes bundles to position them in machine. Pushes and pulls waist-high levers to stop and start machine. Listens to and talks with others. Observes job operations. (In some laundries, the EXTRACTOR OPERATOR I reaches up with both hands, grasps hoist hook and attaches it to container, fingers switch to operate hoist and reaches above shoulder height to push and pull door of chute) Pushes heavily loaded basket along monorail track and into position above open extractor or dumping chute.
5. Details of Working Conditions: Works around others in an adequately lighted and ventilated room which is hot and humid from steam and noisy from machine operations. Exposed to vibration of machines in operation. The floor is wet from dirty, soapy water.
6. Hazards: Possibility of injury from slipping on wet floor and of injury to hands and fingers from parts of machine. The inner shell or basket of the extractor continues to revolve for a considerable time after motor has been turned off. If lid is opened before the machine stops, the fingers, hands or arms may get caught in the material in the revolving basket. Blind operator must determine safe pattern for ascertaining positively that the basket has stopped rotating. Some machines are equipped with brakes to facilitate stopping of the machine and some have interlocking devices so that the lid cannot be raised until the basket has come to a complete stop. Care must also be exercised, in moving loaded baskets or trucks, that fingers are not caught between the moving and stationary parts, especially when lowering baskets into the extractor.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Worker secures loaded baskets from where previous worker has left them, pulling load along rail and switching to machine desired, stopping the load directly over the center of the machine.
 - b. With one hand operates push button control to lower basket into position; with other hand guides basket slowly to insure proper position. Must exercise care to maintain proper alignment and to be sure that fingers are not pinched between the racket and machine.

LAUNDRY AND DRY CLEANING

EXTRACTOR MAN (Contd.)7. Sequence of Steps in Position in Plant Surveyed: (Contd.)

- c. Detaches hooks from basket and moves hoist out of position.
- d. Lowers lid of extractor and pushes button to start machine.
- e. Proceeds with loading of adjacent extractors.
- f. After extractor has run a pre-determined length of time, it is automatically turned off; operator then places pressure on foot brake pedal to bring machine to a complete stop. Care should be exercised not to apply brake too hard at first.
- g. Opens lid, attaches hoist hooks and presses control buttons to lift basket out of extractor, pushing load of extracted articles along monorail to position over dump chute.
- h. Trips lever releasing two halves on the bottom of basket which swing open, dumping contents into the chute, which conveys it to shake-out floor below.
- i. Closes bottom of basket and pushes it along monorail, depositing it at the end of the aisle next to the washing machine room.

NOTE: If extractor baskets are not removable, truckloads of wet laundry are pulled or pushed into position beside machine, lifted by hand, and loaded into basket. Operator must be careful that load is uniformly distributed around the basket in order to prevent excessive vibration at high rotating speed. This is usually determined by poking the material with either the hand or a stick. Then, when machine starts, operator must observe vibration to be sure that it is not excessive. If vibration is excessive machine must be stopped and load adjusted. When moisture has been extracted, the clothes will be tightly packed against the walls of the basket and must be pulled loose, lifted out of the basket, and placed in trucks to be pushed or pulled to shake-out room.

Blind operator will learn how to set timing device by judging relation of pointer to knob with respect to vertical and horizontal position. May check accuracy of timing by observing, with the hand, when the moisture has ceased to flow from the outlet tube.

In some plants the extractor operator's functions may be combined with that of pulling the laundry from the wash wheel. He may or may not push the loaded trucks a long distance to the shake-out floor; he may or may not have to select truckloads of materials according to the time of day they must be finished, as indicated on accompanying route slip.

LAUNDRY AND DRY CLEANING

EXTRACTOR MAN (Contd.)8. Equipment as found in the Particular Plant Surveyed:

- a. Identification: Extractor machines are arranged in two rows, one on either side of the monorail conveyor, which is equipped with an electric hoist. Machines are equipped with a push button control for starting and stopping, and automatic timing devices that can be set to stop machine, and with foot pedal to operate brake to stop rotation of the basket. The lid is equipped with interlocking device which prevents opening until rotation has ceased.
- b. Set-up and Maintenance: Operator sets timing device according to type of material being extracted; adjustment and maintenance are made by plant mechanic.
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

In other plants, extractor baskets may not be removable.

Many machines will have: No timing device, in which case the worker determines that sufficient time has elapsed by observing that no moisture is coming out of the drain pipe;

No interlocking lid controls, in which case the operator determines from visual determination, or by touching the edge of the basket, that it has come to rest;

No braking devices, in which case sufficient time must be allowed for the machine to overcome its own momentum.

10. Usual Pre-employment Training: None11. Usual Training Procedure on the Job: Worker is instructed by supervisor for approximately one-half hour, after which he may be checked and assisted, as necessary, by another experienced worker. One day should be sufficient to learn the job.12. Any Training Deviations Suggested for the Blind: Teach a definite safe method of placing basket into extractor and of determining when it has stopped rotating.

LAUNDRY AND DRY CLEANING

EXTRACTOR MAN (Contd.)

13. Production:
 - a. Full: Full production will vary with each plant and particularly between removable and permanent baskets. One may be expected to handle 6 small baskets, or 3 large baskets.
 - b. Time to Reach Normal Efficiency: Worker is usually expected to keep up full production after two or three days' experience.
14. Interrelation with Preceding and Succeeding Jobs: No close relationship with preceding and succeeding jobs, except that in some cases care must be taken to get certain material through on schedule.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: Moderate partial vision, sufficient to travel around work area and perceive large objects at 20 feet.
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: Not recommended.
 2. For the Partially Sighted: If the reading of tags is required, writing and color contrast must be satisfactory with vision available. The degree of lifting should be approved by an ophthalmologist as being compatible with the eye condition of the client.
18. Avoid the following Conditions: Long travel within plant, unsuitable lighting conditions and indistinct or finely written work tags. The machines in each plant must be checked for a safe pattern of operation with the degree and type of vision which the worker possesses.
19. Other Jobs Often Combined for Full Time Employment: Loading or pulling washing machines.
20. Industries, Parts of Industries or Types of Plants where this Type of Job is Frequently Found.

Laundries, hotels, and institutions.

LAUNDRY AND DRY CLEANING

LOADER AND PULLER

1. Name Used for Position in Plant Surveyed: Loader and Puller (wash wheel)

D.O.T. Title: Washing Machine Loader (laundry)
Puller (laundry)

Code: 9-57.21

Alternate Titles: None

D.O.T. Definition: Washing Machine Loader (laund.).

A Laborer, Process. Pushes a hand truck containing soiled articles from the marking and classifying department to the washing machine, and dumps the articles into the machine.

Puller: (laund.). A Laborer, Process. Removes (pulls) washed articles from a washing machine by hand, places them in hand truck, and pushes the loaded truck to the extractor (m).

Items Worked on in Plant Surveyed: Articles to be washed.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: At least average size, good physical strength and endurance; no special mental ability.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, carrying, pushing, pulling, handling.

b. Working Conditions: Inside, hot, humid, wet, dirty, adequate lighting, adequate ventilation, mechanical hazard, moving objects, exposure to burns, working with others, working around others.

c. Skill Required: For totally blind - good travel skill around work area up to 25 feet.

LAUNDRY AND DRY CLEANING

LOADER AND PULLER (Contd.)4. Details of Physical Activities:

(Loader) Repeatedly stoops to floor or to truck, reaches and lifts bundles of soiled laundry; turns and puts the clothes into opening in wash wheel, may walk up to 25 feet, pushing and pulling loaded trucks. May close machine and start operation and observe job processes.

(Puller) Alternately walks around and stands at washing machine during work day. Using both arms, reaches out, grasps wet laundry and pulls it out of washer into extractor compartment or box truck. Pushes and pulls loaded extractor compartment (mounted on hand truck) up to about 25 feet. Observes job processes, or may attach two baskets to overhead monorail hoist and push along this rail to extractor room. May rest up to five minutes between unloading. May team with another worker to reduce time machine is idle. One worker or team may pull only, while another loads only.

5. Details of Working Conditions: Works inside around others in adequately lighted and ventilated surroundings. Atmosphere is hot, humid and wet. Exposed to dirty laundry.6. Hazards: Possibility of slipping on wet floors, of burns from steam lines, and of injury to hands from machine. Care must be taken that machine is completely stopped before opening doors; that doors are properly latched in open position, and that partner is in the clear before closing doors or starting machine. Machines may have automatic interlocks to prevent accidents of this nature. Worker must be careful not to back into aisle in front of moving hand-truck or baskets on overhead conveyor.7. Sequence of Steps in Position in Plant Surveyed:

Loading:

- a. Loader secures truck-full of soiled items from where it has been left at end of aisle by other worker, pulling into position opposite open washing machine.
- b. Pulls laundry from truck and places it in compartment in the machine.
- c. Secures additional trucks and puts contents into other compartments until machine is loaded.
- d. Closes and latches doors.

LAUNDRY AND DRY CLEANING

LOADER AND PULLER (Contd.)7. Sequence of Steps in Position in Plant Surveyed: (Contd.)

Pulling:

- a. Secures empty extractor basket from end of aisle, placing in position so that it is flat against washing machine which has been stopped by washer man or by automatic timing device.
- b. Opens outer and inner doors of washing machine.
- c. Reaches into machine and pulls contents into extractor basket. Should exercise care that material is evenly loaded and distributed.
- d. Loads additional baskets until entire contents of washing machine have been removed.
- e. Rolls two baskets into position so that flat sides are together, securing overhead hoist and attaching hooking device.
- f. Pushes button to operate electric hoist to lift the baskets off the floor.
- g. Pushes on baskets to move hoist along the monorail into storage position at end of aisle.
- h. Pulls control button to lower baskets to the floor and detaches hooking devices.

NOTE: May in other plants start machine or leave this to washer man, or be required to select loads according to colored or wet materials or select according to lot number and time schedule requirements, necessitating reading large handwriting on tags.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Two rows of washing machines are located at opposite sides of central aisle and overhead conveyor track. Machines equipped with interlocking devices to assure stopping at proper place and prevent starting a machine when doors are open. Overhead monorail hoist equipped with electric power unit for lifting loads.
- b. Set-up and Maintenance: All adjustment, maintenance and repairs made by plant mechanic.
- c. Modification: None

LAUNDRY AND DRY CLEANING

LOADER AND PULLER (Contd.)

9. Equipment Variations Which May be Found in Other Plants:
Extractor baskets may be on flat trucks and pushed along by hand into extractor room. Laundry may be pulled into box-like trucks and pushed along aisle to extractor room. Some washing machines may not have interlocking door safety devices. Washing machines may not have automatic positioning devices for stopping inner cylinder in correct position. In this case an arrow on a revolving disc may serve as an indicator.
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Supervisor or washer man gives new worker instructions or turns him over to a partner for instruction.
12. Any Training Deviations Suggested for the Blind: None. (Be certain that blind worker is in good enough physical condition to stand extra physical demands of the job)
13. Production:
 - a. Full: Varies with number of wash wheels and length of time of washing; no standard set. Some workers can take care of three to four wash wheels per team of two workers.
 - b. Time to Reach Normal Efficiency: Must keep up with the work from the start.
14. Interrelation with Preceding and Succeeding Jobs:
Must load and unload machines in scheduled time, according to the particular plant, in order that entire day's production of washing may be accomplished.
15. Teaming with Other Workers: No close teaming with other workers; where two workers operate as a team they mutually agree upon the division of such duties as securing loaded trucks, removing loaded trucks, stopping machine, and opening doors. Also, must exercise care when closing doors to be sure that partner is in the clear.
16. Modification, Deviation, Special Tools for the Blind:
No modification. In case of totally blind operator there must be no necessity for the selection of proper load of soiled items; sighted partner must take this responsibility.

LAUNDRY AND DRY CLEANING

LOADER AND PULLER (Contd.)17. Sight Requirements and Conditions:a. Vision Required for the Job: Noneb. Conditions affecting Suitability of a Particular Job:

1. For the Totally Blind: No long travel requirements for securing or disposing of trucks; no selection according to color, reading of tickets, classifying of materials, or locating of hoist unless partner is available who can assume these functions and still maintain an equitable division of work.
2. For Partially Sighted: Adequate lighting for type and amount of vision; travel requirements in keeping with particular visual ability. The degree of lifting should be approved by an ophthalmologist as being compatible with the eye condition of the client.

18. Avoid the Following Conditions: Avoid responsibility for reading detailed instructions, difficult travel conditions. In case of the totally blind, avoid responsibility for selection of proper loads.

19. Other Jobs Often Combined for Full Time Employment: The loading and unloading may be separate duties, or may be combined in various plants; loading and unloading of extractors may also be combined with tending washing machines, especially in smaller plants.

20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

As a separate job in medium or large laundries -- institutional laundries.

LAUNDRY AND DRY CLEANING

FLATWORK IRONER

1. Name Used for Position in Plant Surveyed: Flatwork Ironer.

D.O.T. Title: Flatwork Feeder.

Code: 9-57.21

Alternate Titles: Mangle girl; mangle operator; mangler; spreader, laundry. (The term "mangler" is rapidly becoming obsolete and seems objectionable to many laundry operators.)

D.O.T. Definition: Lays clean, damp flatwork pieces on a feeder roller that conveys them into a flatwork ironing machine.

Items Worked on in Plant Surveyed: Damp tablecloths, napkins, sheets, and hand towels.

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Any size; good physical stamina; good arm and finger dexterity; no special mental ability.

3. Physical Demands:

a. Activities: Walking, standing, reaching, lifting, pulling, handling, fingering, talking, turning, feeling, hearing.

b. Working Conditions: Inside, hot, humid, noisy, adequate lighting, adequate ventilation, working with others.

c. Skill Required: Unskilled; must be able to quickly detect edges of cloth, differentiating between hems and selvage edges, and feel wrinkles. Good orientation to locate items on poles or tables behind operator and quickly place them in the correct position on the feed roll.

4. Details of Physical Activities: Stands all day; repeatedly reaches forward with both hands to grasp, lift, and position small, clean, damp pieces of flatwork on feeder roller; turns around and secures large pieces by grasping one corner simultaneously with similar action by worker at other edge of machine, and lays edge on feed ribbons; slight pull to stretch out wrinkles. Fingers small articles and canvas markers; occasionally may handle levers to adjust speed of rollers, and valves to adjust sprinkler. Listens to and talks with other workers; speed is required when feeding small articles.

LAUNDRY AND DRY CLEANING

FLATWORK IRONER (Contd.)

5. Details of Working Conditions: Works inside with another feeder in adequately lighted and ventilated surroundings; exposed to hot, humid atmosphere, and to noise from the operation of nearby machines.
6. Hazards: None. Small smoothing roller or safety gate gives warning if hands travel too far along conveying ribbons; hand may pass under this roller and be retracted without injury. Hand pressure against the gate, or that due to bunching of material, automatically stops machine.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Pole loaded with bundles of shaken-out items is placed back of feeder by other workers; feeder takes a bundle of small items and places them on rail at front edge of machine.
 - b. With both hands grasps edge of article at or near the corners, placing it a short distance up feed ribbons; in the feeding of some articles may continue to pass hands along edges to determine that they are laid out smoothly. According to size of articles and speed of rolls may lay one, two or three rows of articles on conveyor.
 - c. Large articles are taken from pole behind operator, one at a time; two persons working as a team simultaneously grasping exposed corner of large article and laying it on the conveyor ribbon, at the same time stretching it slightly between them.
 - d. With one hand each feeder feels along the edge of the article, straightening it out and keeping it slightly stretched between them to remove wrinkles.
 - e. As the end of the piece is approached feeder reaches back with one hand to secure the next article.

NOTE: If an article starts crooked, the sighted partner jerks it out from under the smoothing roll or stops the machine. In order to sufficiently dry the material being ironed, the speed of the machine may be adjusted according to weight of articles in accordance with the judgment of feeder or information relayed from catcher. In some plants doing family bundles, the feeder may be required to check the number or type of pieces against the accompanying identification slip.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Medium size flatwork ironer with smoothing roll; rack on floor behind workers supporting poles on which work is supplied; stop and start switch and speed change lever are located at the right hand side of machine.

LAUNDRY AND DRY CLEANING

FLATWORK IRONER (Contd.)

8. Equipment as Found in the Particular Plant Surveyed: (Contd.)
- b. Set-up and Maintenance: Major adjustments and maintenance taken care of by plant mechanic; lead worker (sighted) adjusts feeder machine according to requirements of items being ironed.
 - c. Modification: No modifications required for blind workers. Some plants require feeders to alternate with catchers and folders at other end of machine.
9. Equipment Variations Which May be Found in Other Plants: Machines vary in width, accommodating from two to four feeders when ironing small articles; arrangements for supplying of damp articles vary widely in different plants; small items may come to the machine on a conveyor passing between worker and edge of machine; large articles may be laid out flat on a low table to be rolled in position behind workers; loaded poles may be lifted from rack and placed on supports at front edge of machine; shaken out articles may be placed on edge of revolving bin or table which is moved around by feeder as more material is required.
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: New worker is instructed by supervisor; usually works on small articles first and is advanced to slow speed machines for large items. Supervisor and other workers continue coaching worker; in some laundries worker is left to develop her own method of handling work.
12. Any Training Deviations Suggested for the Blind: Employment counselor should make sure that blind worker is thoroughly coached in the methods used by the fastest sighted workers.
13. Production:
- a. Full: Number of items per hour will vary according to size of item and speed of a machine. Linear speed of conveyor ribbon will vary from 40 to 80 feet per minute. Slower speeds for quality work or drying heavy articles. Workers are expected to keep feed ribbon filled with items being ironed.
 - b. Time to Reach Normal Efficiency: Varies from one to three weeks.

LAUNDRY AND DRY CLEANING

FLATWORK IRONER (Contd.)

14. Interrelation with Preceding and Succeeding Jobs: None
15. Teaming with Other Workers: On large items such as sheets and tablecloths, the blind workers sets the pace and the sighted partner adjusts her motions accordingly.
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel to secure damp work; no sorting according to color or markings or checking number of pieces against marker tag; no inspection for soiled spots or defects.
 2. For the Partially Sighted: No inspection for soiled spots or small defects; checking against lot number only depending upon size of the number and visual ability. The degree of lifting should be approved by an ophthalmologist as being compatible with the eye condition of the client.
18. Avoid the Following Conditions: Interchanging with catchers where quality inspection is required at that point; checking against detailed bundle lists. For totally blind, avoid family bundle, for lots may contain small pieces such as thin handkerchiefs which may be easily dropped or lost.
19. Other Jobs Often Combined for Full-Time Employment: Shake-out; folding.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Commercial laundries, linen supply departments, institutions and hotels.

LAUNDRY AND DRY CLEANING

PRESS OPERATOR

1. Name used for Position in Plant Surveyed: Press Operator

D.O.T. Title: Press Operator (V); (Laundry Industry); Presser, Machine I.

Code: 7-57.511

Alternate Titles: None

D.O.T. Definition: A Presser, Machine I, who smooths out wrinkles in washed articles by using a pressing machine: lays washed article, such as shirt, duck coat, or dress on a hollow, cloth-covered pad and operates levers that open a valve to let steam into hollow pad, and bring another pad down onto washed article to press it.

Items Worked on in Plant Surveyed: Starched dresses, coats and trousers.

2. Usual Operator:

a. Sex: Female

b. General Physical Characteristics: At least average height, nimble, quick, better than average physical stamina; heavy people generally not suitable on account of standing all day.

3. Physical Demands:

a. Activities: Walking, standing, stooping, reaching, lifting, carrying, pushing, pulling, handling, fingering, feeling.

b. Working Conditions: Inside, hot, humid, adequate lighting, adequate ventilation, exposure to burns, working around others.

c. Skill Required: Semi-skilled; ability to move quickly and easily from one machine to another a distance of approximately 5 to 7 feet and locate oneself accurately with respect to the machine and move hands quickly and accurately from one part of machine to another without coming in contact with points of danger. Skill to detect the smoothness of the spread of the garment.

LAUNDRY AND DRY CLEANING

PRESS OPERATOR (Contd.)

4. Details of Physical Activities: Repeatedly reaches over and down into a wooden box and pulls out one garment at a time. Shakes out the garment, frequently necessitating reaching up with both arms. Spreading and smoothing garment on buck requires good orientation, a sense of feeling and contact perception; turns and reaches upward to hand garment on conveyor or rack. Walks back and forth between presses approximately 7 feet.
5. Details of Working Conditions: Works inside around others in adequately lighted and ventilated surroundings. Operators constantly exposed to steam and radiant heat from head of machine. Hands repeatedly contact hot areas of garments immediately after pressing.
6. Hazards: Possibility of burns from presser head, necessitating operator maintaining good orientation, quick perception of proximity of heat as indicated by intensity of radiation from presser head and the habit of making first contact with machine at a point lower than the presser head.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Secures damp garment from truck rolled into position by floor attendant and shakes it.
 - b. Spreads portion of garment carefully over pressing buck, rubbing garment with palms of both hands to smooth out wrinkles. Detects by feel or sight when this has been accomplished.
 - c. Lowers presser head by using both hands simultaneously to manipulate interlocking compressed air control buttons located at opposite ends of press.
 - d. Loads other garments into second and third press successively.
 - e. Opens first press by tripping lever on preceding press.
 - f. Repositions garment so that adjacent unpressed surface is on the buck, adjusting and smoothing out garment.
 - g. Lowers head as before.
 - h. Trips lever to open succeeding press and repeats process from one press to another until all garments are finished. Exercises care to have outside surface of garment always next to presser head so that this surface will have a shiny finish and be sure all wrinkles are removed before pressing.
 - i. Removes finished garment from press; places it on hanger, hooks hanger on overhead conveyor.

LAUNDRY AND DRY CLEANING

PRESS OPERATOR (Contd.)

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Three steam heated presses are arranged in hollow square with interlocking compressed-air controls for safety in closing and convenience in opening; raising the head of one machine is accomplished by manipulating controls on preceding machine. Lower Portion or buck, is canvas-covered and varies in shape according to types of garments to be pressed. Upper portion is metal steam chest with polished surface to contact article to be pressed.
 - b. Set-up and Maintenance: Adjustment and repair of equipment is done by maintenance worker except that in some plants operator may change the canvas on the buck as it becomes dirty or scorched.
 - c. Modification: No modification required for blind workers.
9. Equipment Variations Which May be Found in Other Plants:

Arrangements of equipment will vary among plants. For example, presses may be arranged in a straight line, requiring longer travel. Each may have independent controls.
10. Pre-employment Training: None usually required.
11. Usual Training Procedure on the Job: New operator instructed by supervisor and practices each day as long as condition of hands will permit. Hands gradually become toughened to the handling of hot garments.
12. Any Training Deviations Suggested for the Blind: Blind workers should be given their first instruction in the training department or a vocational school shop until they become conditioned to the job in order that the need for a toughening-up period shall not be blamed on their blindness.
13. Production:
 - a. Full: Varies in different plants and according to types of garments.
 - b. Time to Reach Normal Efficiency: Two to four weeks.

LAUNDRY AND DRY CLEANING

PRESS OPERATOR (Contd.)

14. Interrelation with Preceding and Succeeding Jobs: None
15. Teaming with other workers: None
16. Modification, Deviation, Special Tools for the Blind: No modification of equipment or deviation from procedure.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: Wet garment truck to be rolled into position by floor worker; disposition on to overhead conveyor or rack removed by floor worker; sufficient number of presses so that any unsuitable type of garments may be routed to sighted workers.
 2. For Partially Sighted: Same as above except that sight may permit traveling some distance to secure and dispose of garments; adequate lighting for the type and amount of vision.
18. Avoid the Following Conditions: Long travel in securing and disposing of garments, and extreme light changes for some types of partially sighted; responsibility for inspection for soiled spots, wrinkles, scorching, missing buttons, necessity for reading gauges, requirements for pressing complicated garments involving the setting of pleats, ruffles, etc.
19. Other Jobs Often Combined for Full Time Employment: Shake-out, flatwork feeding, folding, sock ironing.
20. Industries, Parts of Industries or Types of Plants Where this Type of Job is Frequently Found:

Commercial, hotel and institutional laundries.

LAUNDRY AND DRY CLEANING

SHAKE-OUT GIRL

1. Name Used for Position in Plant Surveyed: Shake-out Girl

D.O.T. Title: Shaker, wearing apparel such as shaker, handkerchief; a Laborer, Process, or Shaker, Flatwork.

Code: 9-57.21

Alternate Titles: Opener; shake-out girl, flatwork; spreader(laund.)

D.O.T. Definition: Shakes out the creases and the folds in semi-dry flatwork, by hand, to prepare them for the flatwork feeder; hangs articles on racks or poles; usually works in a team of two to facilitate handling of large articles.

Items Worked on in Plant Surveyed: Towels and aprons.

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Medium size, good physical endurance, good fingering and feeling; less than average mental ability (not excessive mental retardation). Heavy persons usually unsuited on account of standing all day.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, carrying, pulling, handling, fingering, feeling, arm motion.

b. Working Conditions: Hot, humid, adequate lighting, adequate ventilation; working with others.

c. Skill Required: Unskilled. Must be able to detect the texture of different materials and parts of garments of flatwork, such as hems and seams; good orientation within arm's reach, including the ability to accurately relocate one or several stacks of items.

4. Details of Physical Activities: Stands, and stoops slightly reaching out with both hands to grasp and handle damp pieces of flatwork and to raise arms above shoulder level in shaking pieces vigorously all day; turns, stretches both arms sideways and forward in placing piece on rack on table. Must determine proper edge of article or garment by such indicators as hem or seam

LAUNDRY AND DRY CLEANING

SHAKE-OUT GIRL (Contd.)

4. Details of Physical Activities: (Contd.)
and place on rack accordingly. Frequently works with another worker, pulling large pieces with both hands to smooth wrinkles out of them. Occasionally lifts and carries bag of washing, weighing about 15 lbs., a short distance to work table.
5. Details of Working Conditions: Works inside with others in adequately lighted and ventilated room which may be hot and humid from steam.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed: Worker stands at shake-out table or bin.
 - a. Pulls damp articles out of box-like truck which has been rolled into position by floor worker, placing them on table.
 - b. Picks up one article at a time; locates a certain edge of article such as hem edge of towel or top edge of aprons.
 - c. Grasps a corner in each hand, with one motion, stretches and vigorously shakes it to remove wrinkles.
 - d. Drapes the article over the top edge of the side boards of the table, always putting the right side up. The proper side can be identified by the end seam or other construction features of the article. When the truck load contains several types of sizes of article, it may be necessary to make as many numbers of stacks of shaken-out items.
 - e. When stack of articles becomes two to three inches thick, or apparently all of that type has been shaken out, the stack is removed and laid over a pole or rack placed in position close behind the shaker by a floor worker.
 - f. When large articles such as tablecloths or sheets are to be shaken out, the two workers operating as a team are standing between the truck and pole or rack; one secures the edge of the article and pulls on it until the other end of the edge has been reached and the entire article is pulled free from the mass in the truck.
 - g. Each worker then secures an additional corner and they pull, shake and stretch the article to remove wrinkles.
 - h. Each worker brings her two corners together grasping in one hand, and with the other hand locates and straightens out the new corner formed by the folding. The article may be again stretched and shaken depending upon requirements of the particular type of article.

LAUNDRY AND DRY CLEANING

SHAKE-OUT GIRL (Contd.)7. Sequence of Steps in Position in Plant Surveyed: (Contd.)

- i. Holding the article with the long edges parallel to the bar, the two workers simultaneously move it across the pole and drape it so that it is lengthwise, with half on either side.
- j. Before completely releasing the article, the outside corner of the top layer at each end is brought back slightly past the top of the pole so as to form a triangle-shaped fold, which may be easily grasped by the flatwork feeder in succeeding operation. This fold should be approximately uniform for the convenience of the worker in the succeeding operation.
- k. Loaded poles are pushed along the rack by the shakers and later removed by other workers.

NOTE: In industries doing "family bundle work" damp articles may be in net bags with identification slip attached, in which case shaker unpins top of bag, carefully retaining identification tag; dumps out contents and when all articles have been shaken and draped over edge of table, places identification slip on top of stack which is then removed to the pole. It is important that care be taken at this point that small, flimsy articles are not lost. Shaker may have the responsibility of sorting articles such as towels for identifying colors or other markings, or sorting according to the condition of the article with respect to wear, tear, and stains.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Shake-out tables having sides approximately 8 inches high form a box-like top; workers may work at one or more sides of the table. Poles about 10 feet long are laid on racks approximately 4 feet high, located within convenient reach of worker standing opposite the table.
 - b. Set-up and Maintenance: None required.
 - c. Modification: None.
9. Equipment Variations Which May be Found in Other Plants: In some plants, operator may shake out directly from the truck box, sides of which are approximately 3 feet high, draping articles over the edge of the box, and later removing stack to the pole. Large articles such as sheets and tablecloths may be laid on low platform instead of being draped over a pole. Large, square shake-out table may be mounted on

LAUNDRY AND DRY CLEANING

SHAKE-OUT GIRL (Contd.)

9. Equipment Variations Which May be Found in Other Plants: (Contd.)
pivot at the center, so that when edges have been loaded with shaken-out articles, the table may be revolved, bringing such supply of articles into the convenient and proper positions for the flatwork feeder. Floor worker may have the duty of pulling the mass of damp articles from the truck and depositing it in the middle of the shake-out table.
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: The shaker operation is often the beginning job for the worker in the laundry. Usually a supervisor gives primary instruction and worker may be coached or given operating tips from time to time by adjacent workers. Original instructions usually take only 10 to 15 minutes.
12. Any Training Deviations Suggested for the Blind: None
13. Production:
 - a. Full: No figure usually available, but two shakers may be expected to keep a sufficient supply available for two flatwork feeders; otherwise production is judged by supervisor.
 - b. Time to Reach Normal Efficiency: Two days to two weeks.
14. Interrelation with Preceding and Succeeding Jobs: Neatness of shake-out and proper stacking of articles contribute to the facility with which flatwork feeder can secure each article and place it on the feed ribbons. This is especially important in the case of the turned corners of large articles.
15. Teaming with Other Workers: Teaming with another worker is important in shaking out large articles. A system should be agreed upon to assure that both workers get hold of the same article. A blind worker may take the lead in securing the first corner, or the sighted worker may secure this corner and hand it to the blind worker, and both proceed with the article. Practice and familiarity with each others procedure will be necessary so that in the stretching and shaking, workers operate in unison and one does not jerk the article out of the other's hand. When this teaming is well developed, considerable loss of time and production is avoided.

LAUNDRY AND DRY CLEANING

SHAKE-OUT GIRL (Contd.)

16. Modification, Deviation, Special Tools for the Blind: Truck loads containing any articles which must be inspected or sorted should be routed to sighted workers.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel beyond work area to obtain articles or trucks; no sorting or inspection. In cases where each lot is kept separate the arrangement should be such that the blind person can work alone at the table so as not to confuse articles with those being handled by another worker.
 2. For the Partially Sighted: Adequate lighting for the type and amount of vision; sorting or inspection should be such as not to over-tax the particular worker's sight. For instance, if towels have broad distinctive colored stripes for identification, partial sight may be sufficient to efficiently identify for sorting purposes, while the same would not be sufficient if small stains or tears had to be detected. The degree of lifting should be approved by an ophthalmologist as being compatible with the eye condition of the client.
18. Avoid the Following Conditions: Inspection for tears and stains, reading or checking of lot numbers or lists, excessive travel, transfer to a job that cannot be performed without the use of sight.
19. Other Jobs Often Combined for Full Time Employment: Flatwork feeding, conveyor loading, tumbler operator.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

In any laundry.

LAUNDRY AND DRY CLEANING

APRON STRING PULLER

1. Name Used for Position in Plant Surveyed: Apron String Puller.

D.O.T. Title: Laborer, Process

Code: 9-57.21

Alternate Titles: None

D.O.T. Definition: None

Items Worked on in Plant Surveyed: Bar Aprons

2. Usual Operator:

a. Sex: Male

b. General Characteristics: No particular size or type indicated; physical stamina required to stand all day. Less than average mental ability (not excessive mental retardation)

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, pushing, pulling, handling, fingering, feeling.

b. Working Conditions: Inside, dirty, adequate lighting, adequate ventilation, working alone.

c. Skill Required: Gross orientation in work area to locate trucks and return to original work position.

4. Details of Physical Activities: Reaches into box truck and pulls aprons from pile, feels edge of garment to determine opening into the hem which forms the tube for the strings, fingers to fit tube on to metal rod which pulls apron strings through the tube. Arm action required in pulling on and off the rod and placing apron in adjoining empty truck; may be required to push or pull trucks a short distance; stands all day.

5. Details of Working Conditions: Job is usually located in one corner of marking or classifying room, away from the usual dampness and heat of the laundry; some unpleasantness from the dirty aprons. Works alone except that other worker will bring in loaded truck and take away refilled ones.

LAUNDRY AND DRY CLEANING

APRON STRING PULLER (Contd.)

6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Worker secures aprons from truck.
 - b. Locates opening in tubular hem.
 - c. Takes hold of apron string which is adjacent to this opening and follows to its end.
 - d. Slips end of the string into eye at the end of the horizontal rod.
 - e. Places opening of tubular hem over the end of the rod and pulls the tube full length on to the rod, which leaves one string inserted in the tube.
 - f. Inserts end of second string into eye of rod.
 - g. Removes apron from the rod, which action threads second string into the tubular hem. Care must be taken that strings are threaded through full length into the tube and that the rod has not come out through any torn places in the tube.
 - h. Places garment into adjacent empty truck for removal by floor worker.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Iron rod approximately 4 feet long and one-half inch in diameter projects horizontally from a wall bracket of the height of approximately 42 inches.
 - b. Set-up and Maintenance: None required.
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:
None observed.
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Supervisor instructs worker for ten to fifteen minutes, and checks occasionally during first few days.
12. Any Training Deviations Suggested for the Blind: None

LAUNDRY AND DRY CLEANING

APRON STRING PULLER (Contd.)

13. Production:
- a. Full: In plant surveyed worker handled 300 to 400 aprons per hour.
 - b. Time to Reach Normal Efficiency: Four to ten days.
14. Interrelation with Preceding and Succeeding Jobs: None.
15. Teaming with Other Workers: None.
16. Modification, Deviation, Special Tools for the Blind: None.
17. Sight Requirements and Conditions:
- a. Vision Required for the Job: None.
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: None.
 2. For the Partially Sighted: Adequate lighting for the type and amount of vision.
18. Avoid the Following Conditions: Travel with loaded trucks for totally blind; long travel through traffic for partially sighted.
19. Other Jobs Often Combined for Full Time Employment: Shaker, flatwork feeder, folder.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:
- Linen Supply Laundry or department using this particular type of apron.

HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRY SERIES

Category SI-2

BAKERY PRODUCTS

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PART I

HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERSSPECIFIC INDUSTRY SERIES

BAKERY PRODUCTS

General Information Sheet

Character of the Industry: The manufacture by hand or machine of bread, rolls, and coffee cakes and products of a similar nature; cakes, pies and cream puffs, doughnuts and other pastries; cookies, crackers, pretzels, biscuits and toast.

The size of individual establishments will vary from a plant employing several hundred workers to shops where only three or four persons are employed. As the size of the plant and the degree of routinization and use of scientific methods decreases, the responsibility of the worker for uniform products increases. Here, the worker must not only be able to recognize the probable reaction of the material to the process but must have the ability to make changes in the procedure to correct faulty reaction.

Two general lines of opportunity are open to workers in the industry; those persons interested in machine and large scale production who can master all phases of this work, can progress from apprenticeship or helper job up through the various machine and equipment operations to the supervisory and managerial positions in the plants of large baking organizations. Workers more interested in the handicraft productions of a large variety of products involving a broader knowledge of the physical and chemical reactions of the material can learn the trade usually by serving an apprenticeship and have an opportunity of ownership or management of a retail shop serving the needs of an urban community.

Pies, cakes and other types of pastries may be made in the same plants or apart from those that manufacture bread, rolls, coffee cakes and similar products. Cookies, crackers and pretzels are usually made in a separate establishment.

Distribution of the Industry: All forms and sizes of baking establishments will be found in any part of the country.

BAKERY PRODUCTS

General Information Sheet (Cont'd)

Type of Workers Usually Employed: Even though machines have to a large extent replaced hand work in bakeries, work is still heavy and rather strenuous with the result that many more men than women are employed in the industry. Women are employed mostly for the lighter hand wrapping, packing and finishing jobs and more in the making of cookies, crackers and pretzels than in the making of bread, cakes and pies.

Working Conditions: In compliance with voluntary standards and those established by State and local health and food laws, working conditions in the industry are usually satisfactory. Plants are usually painted in light colors which must be kept clean. They are generally lighted and ventilated. Those jobs performed near ovens subject the worker to heat considerably higher than normal room temperature with the result that workers must adapt themselves to this unavoidable condition. Where flour is handled, there may be considerable dust but workers who are sensitive to this condition are usually provided with masks. Hours of work compare favorably with other industries, although considerable night work prevails particularly in the baking of perishable products such as bread, cakes and pies. In the baking of cookies, crackers, pretzels and such products only standard work shifts are necessary.

Generally speaking, employment is quite steady with very little seasonal work. It will be found that union contracts are in force in most establishments and that union officials will endorse the employment of blind persons.

Hazards, Safety Precautions and Health Conditions: There are no serious hazards in the industry. Moving parts of the machines are well guarded so there is little chance of injury from machine operations. Burns are the chief hazard but these are rarely serious. Bakers itch, a skin infection appearing on the hands from handling dough, most nearly approximate an occupational disease. This is generally avoided by providing hot and cold running water so that workers who handle dough can wash their hands frequently. Heat does not seem to have any adverse effect on the health of the worker.

BAKERY PRODUCTS

General Information Sheet (Cont'd)

General Coverage Jobs Pertinent:

- a. Carton Set-up in GC-1
- b. Wrapping and Packaging GC-2
- c. Material Handling GC-3

Jobs Usually to be Avoided Although Seemingly Suitable:

- a. Cooky Machine Feeder
- b. Pan Washer (machine)
- c. Molding machine Operator
- d. Flour Dumper

Combination Jobs: (Jobs often combined to provide full time employment)

- a. Bread Racker
 - Pan Cleaner (hand)
 - Pan Dumper
 - Pan Greaser (hand or machine)
 - Pan Washer (hand)
- b. Pan Racker
 - Pan Feeder
 - Pan Washer (hand)

PART I

BAKERY PRODUCTS

PAN GREASER (HAND)

1. Name Used for Position in Plant Surveyed: Pan Greaser

D.O.T. Title: Pan Greaser (Hand)

Code: 8-02.10

Alternate Titles: Greaser, swabber

D.O.T. Definition: Greases pans preparatory for use in baking various products by coating the inner surface with animal fat or vegetable oil using a cloth pad; replenishes supply of grease or oil and may heat it over a burner to make it more fluid.

Items Worked on in Plant Surveyed: Cake pans.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, quick movements, particularly of the hands, thorough, average mental ability. In some areas colored workers are employed extensively on this job.

3. Physical Demands:

a. Activities: Walking, standing, turning, reaching, lifting, carrying, handling.

b. Working Conditions: Inside, dirty, noisy, adequate lighting and ventilation, working around others.

c. Skill Required: Unskilled; ability to do light lifting. Ability to move quickly, easily and efficiently from point to point within the work area (approximately 8 by 15 feet) and from a standing position at the work table, quickly and efficiently, locate such items as dirty pans, scraper, grease pan and cloth and removal truck.

BAKERY PRODUCTS

PAN GREASER (HAND) (Cont'd)

4. Details of Physical Activities: Walks to various points within work area, pushing and pulling trucks to or from operating position; stands and turns to remove pans or replace them on the truck; handles them and raps them against work bench to remove cake crumbs; uses hands and arms rapidly to coat the inside with grease.
5. Details of Working Conditions: Works around others inside in adequately lighted and ventilated room, dirty because of cake crumbs and grease, noisy because of rapping of pans.
6. Hazards: Worker is exposed to burns if he is required to prepare grease, by heating it. This hazard can be reduced by teaching worker how to use equipment safely.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Secures hand truck loaded with cake pans to be greased, which has been placed in his work area by other workers.
 - b. Pushes and pulls it into convenient working position adjacent to the work bench.
 - c. Takes pan from truck, sets it on work bench.
 - d. Picks up scraper and thoroughly scrapes the inside of pan to loosen any remaining cake crumbs.
 - e. Turns it over and raps it down on the table to remove cake crumbs.
 - f. Inspects pan to be sure that no cake particles remain.
 - g. Secures grease cloth from grease pan and thoroughly rubs it around the inside of the cake pan, making sure that the entire surface has been coated with grease.
 - h. Returns cloth to grease pan, making sure that it is left in the grease.
 - i. Places greased pan on truck. Repeats this process until truck is filled.
 - j. Pushes truck to edge of work area for removal by another worker.
 - k. Pushes the remaining truck which is now empty into position to receive the next load of greased pans.

NOTE: In some plants the worker is required to prepare his own grease. Workers are sometimes required to travel a considerable distance to deliver greased pans to and collect dirty pans from other workers. In some cases, the pan greaser is not required to clean pans. Bread pans do not require cleaning between greasings.

BAKERY PRODUCTS

PAN GREASER (HAND) (Cont'd)

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Push trucks, work table, grease pan and grease cloth, scraper.
 - b. Set-up and Maintenance: Worker is expected to keep the grease pan replenished and assist in the cleaning of the work area.
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:
 - a. Mixing bowl and gas burner to melt or liquify grease.
 - b. Mixing machine for blending the grease preparation.
 - c. Conveyor belt or roller conveyor for removal of pans (particularly in bread and cookie bakeries).
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Supervisor instructs the worker in all steps of the operation.
12. Any Training Deviation for the Blind: None
13. Production:
 - a. Full: This will vary from 100 to 300 per hour depending upon size and shape of the pans.
 - b. Time to Reach Normal Efficiency: One to three weeks.
14. Interrelation with Preceding and Succeeding Jobs: In some bakeries greaser feeds pans almost directly to the molding machine operator, while in others he loads them onto trucks which may stand by several hours before the pans are filled.
15. Teaming with Other Workers: None
16. Modification, Deviations, Special Tools for the Blind: None

BAKERY PRODUCTS

PAN GREASER (HAND) (Cont'd)

17. Sight Requirements and Conditions:

- a. Vision Required for the Job: None
- b. Conditions affecting Suitability of a Particular Job:
 - 1. For the Totally Blind: No travel beyond the limits of the work area to secure and dispose of materials.
 - 2. For the Partially Sighted: Adequate lighting for and travel requirements compatible with the worker's type and amount of vision.

18. Avoid the Following Conditions: Transfer to other jobs which cannot be performed without the use of sight.19. Other Jobs Often Combined for Full Time Employment: Pan greaser (machine), pan feeder, pan washer (hand), bread racker, pan dumper.20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Any bakery.

BAKERY PRODUCTS

PAN RACKER

1. Name Used for Position in Plant Surveyed: Pan Racker.

D.O.T. Title: Pan Racker.

Code: 8-02.10

Alternate Titles: Frame setter, pan setter, panner helper, stacker, off-boy.

D.O.T. Definition: Loads rack trucks with pans or frames of dough, stacks empty pans on racks; pushes rack trucks as directed.

Items Worked on in Plant Surveyed: Bread in pans.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Alert, agile, average mental ability. Must be strong and active to stand continually and work rapidly for long periods of time.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, carrying, pushing, pulling, handling, talking, hearing.

b. Working Conditions: Inside, sudden temperature changes, dirty, adequately lighted and ventilated, moving objects, working with and around others.

c. Skill Required: Unskilled; ability to handle pans rapidly and guide trucks accurately so as not to collide with other objects or workers.

4. Details of Physical Activities: Walks, pushes and pulls rack trucks weighing between fifty and five hundred pounds from ten to one hundred feet; stands, turns, reaches, lifts and carries pans weighing between one and ten pounds, a distance of approximately five feet; handles pans to load them onto truck; talks with and listens to others to exchange information.

BAKERY PRODUCTS

PAN RACKER (Cont'd)

5. Details of Working Conditions: Works inside with and around others in adequately lighted and ventilated area, exposed to sudden temperature changes in moving materials into and out of proof box, dirty from handling greased pans, hazards from rack trucks being moved up and down aisles constantly.
6. Hazards: Exposed to accident from trucks being moved up and down aisles. Must have sufficient vision to reduce this hazard to an absolute minimum.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Takes pan filled with molded dough from molding machine operator.
 - b. Places it in rack truck
 - c. Continues this procedure until truck is filled.
 - d. Pushes and pulls truck a distance from fifty to one hundred feet and stores it in proof box.
 - e. After dough has risen sufficiently (as prescribed by master baker) removes rack from proof box and pushes and pulls it into position for use by the bakers at the feed end of the oven.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Rack truck.
 - b. Set-up and Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants: Racks may be suspended from a monorail instead of rolling on casters.
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Supervisor instructs worker in all steps of the operation. Follow-up coaching may be given by other workers.
12. Any Training Deviations Suggested for the Blind: None

BAKERY PRODUCTS

PAN RACKER (Cont'd)

13. Production:
- a. Full: Must keep up with work assigned.
 - b. Time to Reach Normal Efficiency: One week to one month.
14. Interrelation with Preceding and Succeeding Jobs: Must remove pans of dough quickly in order not to slow up the molding machine operator. Must keep close check on the time that filled pans remain in the proofing room.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
- a. Vision Required for the Job: Vision sufficient to travel around work area and perceive large objects at 20 feet; major portion of visual field.
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: Not recommended
 2. For the Partially Sighted: The degree of lifting and pulling should be approved by an ophthalmologist as being compatible with the eye condition of the worker.
18. Avoid the Following Conditions: Transfer to job with sighted requirements beyond the workers type and amount of vision.
19. Other Jobs Often Combined for Full Time Employment: See General Information Sheet.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:
- Any production type bread bakery.



BAKERY PRODUCTS

PAN DUMPER

1. Name Used for Position in Plant Surveyed: Pan Dumper

D.O.T. Title: Pan Dumper

Code: 8-02.10

Alternate Titles: Dumper; hot stuff man; oven dumper; oven-unloader helper; pan shaker; shake-out man.

D.O.T. Definition: Removes baked products from pan; picks up pan of products, using pads on each hand for protection against burns, and raps lower edge or bottom of pan against table to loosen products; inverts pan to dump contents on table or on conveyor, and stacks empty pans on racks for removal. May, when handling soft cakes, shake pans to loosen them, without dumping the pans.

Items Worked on in Plant Surveyed: Bread

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, strong, agile, average ability to withstand unusually high temperatures, average mental ability.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, carrying, pushing, pulling, handling, hearing.

b. Working Conditions: Inside, hot, adequate lighting and ventilation, exposure to burns, works around others.

c. Skill Required: Unskilled; ability to stand all day and work rapidly with hands and arms, ability to move from point to point within a work area of approximately five by fifteen feet, easily, quickly, and efficiently. Ability to coordinate hands and arms as well as judge position and distance in order to handle hot pans quickly and to stack them evenly in rack trucks.

BAKERY PRODUCTS

PAN DUMPER (Cont'd)

4. Details of Physical Activities: Stands all day, stoops slightly, and reaches forward below shoulder height to pick up hot pans of bread; shakes them vigorously or raps them against work table, turns and carries them a distance of four to eight feet and places them in truck for removal.
5. Details of Working Conditions: Works inside around others in adequately lighted and ventilated area, hot because of working near ovens and handling pans directly from the discharge end of the oven, exposed to burns while handling hot pans.
6. Hazards: Chief hazards of this job are burns, which, while not usually of a serious nature, can readily be received from the hot pans which have just come from the oven. This hazard can be reduced by wearing hand pads which are usually made of heavy burlap. These pads are approximately eight inches square and have a slit near one edge so that they can be slipped onto the wrist, thus permitting pads to be in convenient position for use when handling hot materials and allowing them to be out of the worker's way when they are not needed.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Using protective pads, the worker picks up a hot pan containing five, one-pound loaves of bread as it comes from the discharge end of the oven.
 - b. Turns it over and strikes its free edge against the conveyor belt in front of him, causing the bread to drop onto the conveyor belt for removal.
 - c. Turns and carries pan to rack truck which is located between four and eight feet from the place where he was standing when he dumped the bread.
 - d. Places pan on truck.
 - e. Returns to station number two for another.
 - f. Repeats process and returns to station number three for the next pan of bread.

NOTE: At the discharge end of the oven, there are three loading stations which are adjacent to each other and the pans of bread are delivered to them automatically in succession. The worker can tell when the pans are ready to be dumped as they make a noise when they drop into position.

PART I

BAKERY PRODUCTS

PAN DUMPER (Cont'd)NOTE: (Cont'd)

While the procedure described is typical, it is not universal. Bread pans vary in size to hold from one to five loaves, depending upon the size and type of bread being baked. If cakes or cookies are dumped, the worker has to be much more careful so as not to break the product or throw it out of shape. In some plants, the product is dumped onto a table and manually removed by the dumper or another worker. Cakes may be loosened by shaking the pan which is then gently turned over so that the cake can be removed without breaking.

Size and type of pans are varied, depending upon the product produced. Sandwich loaves are baked in pans with metal lids, requiring removal before dumping.

Pans may be disposed of onto special conveyor instead of onto truck.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Bread conveyor belt, rack truck resembling open book case, and burlap hand pads.
 - b. Set-up and Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:

A transfer table may be used instead of a conveyor belt for removal of products. Heavy gloves instead of burlap pads may be provided for the worker, although pads are in general use as they permit circulation of air about the hands and still give adequate protection. Flat platform trucks or a conveyor may be used for the removal of empty pans.
10. Usual Preemployment Training: None
11. Usual Training Procedure on the job: The supervisor instructs the worker in all steps of the job.

BAKERY PRODUCTS

PAN DUMPER (Cont'd)

12. Any Training Deviations Suggested for the Blind: A blind person should be taught not to reach for a pan until he hears it drop into position, otherwise he may get his fingers caught between the pan and the end of the slide and receive a very bad burn. In reaching for hot pans, the blind worker should be taught to approach from above, with the protecting burlap pads between his hand and the hot pans. He should also be taught to follow a definite routine method of loading the trucks so that he can stack the pans quickly, easily and not lose any time in finding an empty space for them on the truck.
13. Production:
 - a. Full: This will vary depending upon the item being baked, such as bread, cake, cookies, etc., as well as the size, shape and ingredients. A common straight flow oven bakes 3600 one-pound loaves per hour.
 - b. Time to Reach Normal Efficiency: One week to one month.
14. Interrelation with Preceding and Succeeding Jobs: None
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel beyond work area to secure and dispose of trucks.
 2. For the Partially Sighted: Adequate lighting for the type and amount of vision.
18. Avoid the Following Conditions: Transfer to other jobs which cannot be performed without the use of sight.
19. Other Jobs Often Combined for Full Time Employment: Bread racker, pan greaser.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Any bakery.

PART I

BAKERY PRODUCTS

BREAD RACKER

1. Name Used for Position in Plant Surveyed: Bread Racker

D.O.T. Title: Bread Racker

Code: 8-02.9

Alternate Titles: Bread and roll racker; bread cooler; bread dumper; bread stacker cooler; cooler man; rack helper; set-off boy.

D.O.T. Definition: Stacks freshly baked bread on racks or conveyors for removal to cooling compartments; pushes racks of hot bread to cooling room or to slicing and wrapping division. May start and adjust speed of conveyor and regulate temperature of cooling room.

Items Worked on in Plant Surveyed: Bread

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size except a person who would experience difficulty in reaching upper shelf of bread rack which is approximately six feet above the floor. Better than average mental ability.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, carrying, pushing, pulling, handling, talking, and hearing.

b. Working Conditions: Inside, hot, sudden temperature changes, adequate lighting and ventilation, exposure to burns, working with and around others.

c. Skill Required: Semi-skilled, exceptionally good general orientation, good memory, good hand and arm coordination.

4. Details of Physical Activities: Stands all day, working rapidly with hands and arms, picks up hot bread and turns and places it on rack resembling an open book case, stoops to place loaves on lower shelves, reaches above shoulder height to place bread on upper shelves. Pushes and pulls bread rack into position in cooler room, talks with team mate concerning the work to be done.

BAKERY PRODUCTS

BREAD RACKER (Cont'd)

5. Details of Working Conditions: Works inside with and around others in adequately lighted and ventilated area. Exposure to sudden temperature changes, when placing bread rack in cooler room and when returning to fill next rack. Exposure to burns from handling hot bread.
6. Hazards: The worker's hands may become burned unless hot bread is handled quickly. Until his hands become toughened, it may be necessary to wear gloves or burlap pads.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Working with both hands, worker picks up hot bread from transfer table (bread is delivered from the oven to transfer table by a conveyor belt).
 - b. Turns around and places the loaves in rows on the shelves of the bread rack which is suspended on rollers from an overhead monorail.
 - c. Repeats this procedure until rack is completely filled.
 - d. Pulls the rack along track (rack weighs approximately 300 pounds but rolls quite freely) and by means of a switching device, delivers rack to proper position in the cooling room. (The switches are controlled by pulling the proper ropes suspended from the mechanism and can easily be located if the position is kept in mind by the worker). Worker must also remember which tracks are full and which tracks are empty in order to save time and avoid keeping the cooler room door open unnecessarily.
 - e. Removes rack of cooled bread from cooling room and places in position (15 or 20 feet from the cooling room) where slicers and wrapper operators can secure them.

NOTE: On this job, two men usually work as a team permitting one worker to place racks in and remove them from cooler room while the other worker is loading them.

In some plants, racks are rolled on casters instead of along a monorail. Also in some cases, bread taken from a transfer table is placed on a conveyor for removal to the cooling room.

BAKERY PRODUCTS

BREAD RACKER (Cont'd)

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Transfer table, bread rack resembling open book case suspended from overhead track, switching devices.
 - b. Set-up and Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:

Bread rack may be mounted on casters or rollers. Conveyor belt may be employed for the removal of bread. Transfer table may be with or without sides and may be stationary or of a rotating type.
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Supervisor instructs worker in all steps of the job and team mate follows up until worker understands job thoroughly.
12. Any Training Deviations Suggested for the Blind: If a monorail conveyor is used, a blind worker should be taught to locate the ropes for operating the switches by touch and position in relationship to some nearby object which can be quickly and easily located. He should be able to locate all of the switches before he actually starts to work. He should also learn how to arrange the loaves on the racks so that they are evenly spaced and in straight rows. The spacing can be accomplished by using the fingers as a gauge to keep the rows straight. He should be taught to place the first loaf correctly with relation to the back edge, and then using it as a pilot for keeping the rest of the row straight. As he goes along, the front edge of the shelf can easily be used to determine that the row is running straight, if he will use a particular part of his arm or hand as a resting point.
13. Production:
 - a. Full: Two workers are required to rack and store from 500 to 1500 loaves of bread per hour.
 - b. Time to Reach Normal Efficiency: Two days to two weeks.

BAKERY PRODUCTS

BREAD RACKER (Cont'd)

14. Interrelation with Preceding and Succeeding Jobs: None
15. Teaming with Other Workers: This job is usually set up on the basis of team work. If a monorail conveyor rack is used, an arrangement should be made whereby the blind worker will know where his sighted team mate has placed his racks. If a caster type rack is used, it is generally found to be impractical for a totally blind person to push or pull these racks to the cooler. In some instances, this has been made the responsibility of the sighted worker; however, this would place a heavy work-load on the blind worker since the loading of racks requires very fast movement and persons generally cannot stand up under the speed requirements.
16. Modification, Deviation, Special Tools for the Blind:
As explained under Section 15, modifications of the work procedure are necessary if the worker is totally blind and if caster type racks are used.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: Conveyor belt for removal to cooling room or monorail bread rack with convenient travel to cooling room, or if caster type rack is used, assignment of the removal duty to a sighted person.
 2. For the Partially Sighted: Adequate lighting for the type and amount of vision of the worker.
18. Avoid the Following Conditions: Transfer to other jobs which cannot be performed without the use of sight.
19. Other Jobs Often Combined for Full Time Employment: See General Information Sheet.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Bread bakeries which bake on a production basis.

BAKERY PRODUCTS

GRINDER OPERATOR II

1. Name Used for Position in Plant Surveyed: Grinder Operator

D.O.T. Title: Grinder Operator II

Code: 9-63.11

Alternate Titles: None

D.O.T. Definition: Grinds discarded and stale baked goods, by machine into a meal to be sold or re-used; starts machine and adjusts grinding rolls by turning handwheels; dumps scrap goods into hopper, segregating by type and discarding burned pieces; removes discharged meal and dumps it into barrels; moistens some products before grinding to prepare a paste product used in making cookies. May weigh filled barrels, mark the weight on them and keep a record of material ground. May grind cheese for use in making cheese-flavored products.

Items Worked on in Plant Surveyed: Crackers

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, agile, careful, no special mental ability.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, carrying, handling, feeling, talking, hearing.

b. Working Conditions: Inside, dusty, noisy, adequate lighting and ventilation, mechanical hazards.

c. Skill Required: Semi-skilled; ability to move about work area (4 feet by 20 feet) quickly, easily and efficiently. Skill in operating and adjusting simple power machine.

4. Details of Physical Activities: Stands all day, stoops slightly to remove crackers from tote box, turns, reaches, fingers and handles them to place in grinder and removes box of meal from delivery spout; lifts boxes weighing approximately 50 pounds and carries them from 5 to 15 feet; receives verbal instruction from and talks to others.

BAKERY PRODUCTS

GRINDER OPERATOR II (Cont'd)

5. Details of Working Conditions: Inside, works around others in adequately lighted and ventilated room, dusty because of powdered cracker and cooky dust thrown from grinder; noisy, due to operation of grinder and other machines.
6. Hazards: Exposure to mechanical hazards of grinder. If the worker sticks his hand too far into the hopper of the machine, he may get his fingers cut in the moving parts, therefore, he should be taught to observe a safe method of operating the grinder before he is put to work. One method is to use a stick for a ram with which to force the crackers into the grinding mechanism of the machine. Another is to press the crackers down with the flat of the hand, allowing the fingers to extend beyond the outside edge of the hopper.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Picks up a handful of crackers from a box which has been brought to him by a floor worker.
 - b. Places crackers in hopper of machine (approximately 8 inches in diameter) while it is running.
 - c. Repeats this process until the container beneath the discharge spout of the grinder machine is full. This container holds approximately twenty pounds of cracker meal.
 - d. Lifts container of cracker meal and moves it 5 feet to a platform scale, weighs the meal by checking the weight shown on the bar of the scale and deducting the known weight of the container (a totally blind person can read this scale accurately by counting the notches on the bar).
 - e. Using a crayon, marks weight of cracker meal on container.
 - f. Removes container of meal from scales and places it on a truck for removal by another worker.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Simple food grinding machine with adjustment for coarse, medium and fine grinding, supply truck, cracker meal container, platform scale with notched beam. This is the type of platform scale which is in general use in many plants.

BAKERY PRODUCTS

GRINDER OPERATOR II (Cont'd)8. Equipment as Found in the Particular Plant Surveyed (Cont'd)

b. Set-up and Maintenance: The operator is expected to adjust the fineness of grinder depending on the type of meal which is being ground. This is accomplished by moving a hand wheel to one of three notches.

c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Scales may be of balance type or those with a visual dial. Workers may have to pack meal or bread crumbs into sacks, weighing from five to fifty pounds. In this event, sacks are used instead of boxes to catch the meal or crumbs as they come from the discharge spout of the grinder.

10. Usual Pre-employment Training: None11. Usual Training Procedure on the Job: Supervisor instructs worker in all steps of the operation.12. Any Training Deviations Suggested for the Blind: Blind workers should be taught to observe a safe method of feeding material into the grinder. A broad ended stick may be used as a ram or the material may be held and forced down by the palm of the hand with fingers resting on and extending beyond the edge of the hopper.

Prior to placement, the worker should be thoroughly acquainted with the type of scale used in the plant and taught a method of using it efficiently. In the case of ordinary balance scales, the weights are usually marked in such a way that a blind person can readily feel the numbers on them. He can tell when the scales are balanced by feeling with the fingers and determining the distance between the base and the balances on either side. If a beam scale is used, it will generally be found that the weight bar is notched and a blind person can readily count the notches. If this condition does not exist, the numerals may be stamped into the bar heavily enough to permit reading by touch or it may be possible to make slight markings on the bottom edge of the bar. If the weight must be marked on the containers of meal, the worker should be taught to write numbers correctly.

BAKERY PRODUCTS

GRINDER OPERATOR II (Cont'd)

13. Production:
 - a. Full: One hundred to three hundred pounds per hour depending on the capacity of the grinder and duties of the worker.
 - b. Time to Reach Normal Efficiency: One day to one week.
14. Interrelation with Preceding and Succeeding Jobs: None
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: Special electrical auditory attachments may be added to scales with visual dials and will still permit their use by sighted persons. None of these modifications will reduce the efficiency of the scales, particularly those with visual dials. If a platform scale is used and the weight bar or reading bar is not notched or marked in such a way that it can be read tactually, small notches may be filed into the lower edge of the bar. The effect of this on the balance of the bar can easily be compensated for by a simple adjustment to the mechanism.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: Travel to secure or dispose of materials should be within a radius of the work area and under traffic conditions compatible with the skill of the worker. No visual reading of scales or responsibility for inspection for burned crackers.
 2. For Partially Sighted: Adequate lighting and ventilation for and travel and reading requirements within the limits of the worker's type and amount of vision. The degree of lifting should be approved by an ophthalmologist as being compatible with the eye condition of the worker.
18. Avoid the Following Conditions: Transfer to jobs which cannot be performed without the use of sight, carton set-up.

BAKERY PRODUCTS

GRINDER OPERATOR II (Cont'd)

19. Other Jobs Often Combined for Full Time Employment: Pan greaser (hand or machine), Pan washer (hand).
20. Industry, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Plants manufacturing cookies or crackers on a large scale; large bread bakeries.

BAKERY PRODUCTS

ICER (HAND)

1. Name Used for Position in Plant Surveyed: Cake Icer

D.O.T. Title: Icer (hand)

Code: 6-02.311

Alternate Titles: Decorator; finisher; froster; icing spreader.

D.O.T. Definition: Covers baked goods with icing or frosting, by hand; spreads icing evenly over the surface of solid baked goods, using a spatula; builds up layer cakes by spreading icing or filling between the layers and then icing the outer surface. May mix icings, may pack iced products in cartons. May be specifically designated according to product iced, such as bread icer, doughnut icer, or roll icer.

Items Worked on in Plant Surveyed: Cake

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Any size, quick movements, particularly of the hands and arms, average mental ability.

3. Physical Demands:

a. Activities: Standing, sitting, reaching, lifting, pushing, pulling, handling, fingering, feeling.

b. Working Conditions: Inside, adequate lighting and ventilation, working around others.

c. Skill Required: Semi-skilled; ability to speedily and accurately locate from a standing or sitting position, items within arms reach, such as icing bowl, turn table, cakes and disposal positions on work table and to transfer material from one to the other quickly and easily. Ability to judge the proper amount of icing to take from the icing bowl in order to properly cover a particular surface. Ability to spread icing evenly and quickly and to determine when the surface is smooth.

BAKERY PRODUCTS

ICER (HAND) (Cont'd)

4. Details of Physical Activities: Stands and sits at work table, reaches forward to lift cake from or return it to conveyor belt; handles, and places it on turntable; handles, fingers and feels it while applying icing.
5. Details of Working Conditions: Works inside around others in adequately lighted and ventilated room.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Reaches forward and picks up one cake from conveyor belt.
 - b. Places cake on small turntable in front of her.
 - c. Reaches into bowl at right and by judgment picks up proper amount of icing with fingers. (Icing supplied by floor worker)
 - d. With both hands, spreads icing evenly over top and sides of cake. (Judgment must be used to determine proper thickness of the icing.)
 - e. When cake is completely iced, worker removes it from turntable and returns it to the conveyor belt which carries it to the wrappers and packers.

NOTE: In some plants, the icer is required to mix the icing. In many instances, the icer must apply frosting to layer cakes, in which case one type of icing may be placed on the bottom layer and another on the top. In this procedure, spatulas are usually used. Methods may vary still further in different plants and with different items.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Conveyor belt, work table equipped with slightly raised turntable approximately ten inches in diameter, and a large bowl holding fifteen or twenty pounds of icing.
 - b. Set-up and Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:

Spatulas are frequently used to spread and smooth the frosting. Transfer table may be used instead of conveyor.

BAKERY PRODUCTS

ICER (HAND) (Cont'd)

10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Supervisor instructs worker in all steps of the operation.
12. Any Training Deviations Suggested for the Blind: None
13. Production:
 - a. Full: Production will vary depending upon the item to be iced. Worker usually ices 150 to 200, six inch, single layer, round cakes per hour.
 - b. Time to Reach Normal Efficiency: Two to four weeks.
14. Interrelation with Preceding and Succeeding Jobs: None
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: If the work is done on a conveyor line, a totally blind person should be placed in the first position so that she may be sure that she always picks up an item which had not been previously iced.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: No responsibility for mixing icing or placing fancy decorations.
 2. For the Partially Sighted: Same as for the totally blind.
18. Avoid the Following Conditions: Transfer to other jobs not practical for performance without the use of sight such as baker or icing mixer.
19. Other Jobs Often Combined for Full Time Employment: Cake bander; wrapper and packer.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Plants manufacturing cakes, (layer, loaf and cup) sweet buns, or rolls and doughnuts.



DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D. C.

July 7, 1948

REHABILITATION SERVICE SERIES NUMBER 58 - SUPPLEMENT 1

To: Division of Vocational Rehabilitation (in States with no separate Agency for the Blind); Commissions and Other Agencies for the Blind

Subject: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category SI-3, Slaughtering and Meat Packing

The attached material on Slaughtering and Meat Packing is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as the third category in Part I, Specific Industry Series. It covers some of the principal jobs in this type of industry but it is not intended to be all inclusive of all possibilities for blind workers. Like the jobs described in the primary issue, those in this category have been observed and tested by a blind member of the staff of the Division of Services to the Blind.

These supplements are being sent out to you in quantities corresponding to the number of the primary issue of the Industrial Handbook already mailed to you. If you need more than we have been sending you, please advise us so that we can adjust our mailing list accordingly.

Delay in the delivery of red pressboard binders in which this supplement is inserted, prevented our supplying this cover with the initial issue. You may wish to insert your original materials in the binder, which also can be expanded to hold future supplements.

Material on other categories of jobs is in preparation and will be forwarded to you for addition to the Handbook as soon as available.

Donald H. Dabelstein
Donald H. Dabelstein
ASSISTANT DIRECTOR

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRY SERIES

Category SI-3

SLAUGHTERING AND MEAT PACKING

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRY SERIES

SLAUGHTERING AND MEAT PACKING

General Information Sheet

Character of the Industry: The Slaughtering and Meat Packing

Industry slaughters and dresses cattle, sheep, lambs, calves, and hogs for sale as fresh or frozen meat. Certain cuts and trimmings are further processed into such products as canned meat, sausage, cured and smoked hams, shoulders, bacon, lard, and gelatin, and the nonedible parts are processed into such commodities as fertilizer and glue. All of these products may or may not be processed in the same plants where the slaughtering and dressing are done. In general, cattle, calves, lambs, and sheep are sold as whole carcasses, and hogs are sectioned.

Forty per cent of the pork is sold as fresh meat; fifty per cent is cured and smoked; and ten per cent is used in the manufacture of sausage and similar products. Ninety per cent of the beef is sold as fresh or frozen meat, and the remaining ten per cent is used in the manufacture of sausage and the like.

The size of the plants varies from those employing fifteen or twenty workers to those establishments employing several thousand workers.

Distribution of the Industry: The industry may be divided into three main groups: National, sectional, and local packers. The national packers have their plants located at the centers of livestock production in the corn belt and ship to their branch plants which are located throughout the country. Sectional packers are located at various population centers and ship to branch or privately owned plants within the area which they serve. These packers do very little manufacturing in comparison to that done by national packers. Local packers are almost exclusively engaged in the production of sausage and smoked meats. They purchase the ingredients, fresh and frozen, from national and sectional packers which interestingly enough also produce sausage and smoked meats.

SLAUGHTERING AND MEAT PACKING

General Information Sheet (Contd.)

A recent survey shows that there are approximately 3,500 Slaughtering and Meat Packing plants in the United States, most of which do a certain amount of manufacturing. Nearly 1,000 of these plants are exclusively engaged in the manufacture of sausage and smoked meats. Approximately 600 produce grease and tallow; fifty manufacture vegetable shortening; sixty process products into glue and gelatine; and twenty manufacture margarine.

Type of Workers Usually Employed: The work in this industry is generally of a heavy and strenuous nature with the result that many more men than women are employed. Women are usually employed on clerical jobs and for the lighter wrapping and packing operations. It is estimated that approximately eighty-five per cent of the persons employed are men; however, in a plant producing sausage and smoked meat, approximately thirty per cent of the employees are women. Nearly fifty per cent of the men are classified as laborers since a large number of the jobs require little or no skill.

Working Conditions: Most of the work is done in refrigerated rooms which are approximately 35°F., making it necessary for the workers to wear heavy clothing in order that they may withstand this uncomfortably low temperature.

Since the floors are constantly washed, they are wet with little pools of water collecting in depressions which result from long periods of wear; consequently, the work areas are damp. Certain jobs are performed in parts of the plant which are hot because of cooking and steaming operations, and workers must accustom themselves to, and dress for, these unavoidable conditions.

As a rule the plants are well lighted and ventilated; however, many workers are subjected to unpleasant odors which are unavoidable because of the very nature of the work.

Hours of work compare favorably with other industries. Daytime employment is customary, although considerable night work is done in the packing and shipping departments. Employment is quite steady with practically no seasonal peaks.

SLAUGHTERING AND MEAT PACKING

General Information Sheet (Contd.)

It will be found that union contracts are in force in most establishments and that union officials will endorse the employment of blind persons.

Many plants are located on the outskirts of town, which often creates transportation problems for the workers.

Safety Precautions, Health Conditions, Hazards: To quote an official of the Institute of American Meat Packing, "injuries are medium in frequency, and low in severity." Workers are exposed to cuts and bruises because of the extensive use of knives and cutting equipment. When using knives on small pieces of meat or removing bones from the surrounding flesh, workers are expected to use either a meat hook or a wire mesh glove to protect the hand which grasps the sectioned carcass.

These accessories are considered safety devices. All minor accidents must be treated by antiseptic methods promptly, since there is an ever-present danger of infection developing if the skin is broken. Ordinary care, however, is all that is required, and no special precautions are necessary.

Although odor is a factor that is unpleasant, it has no effect on the health of employees; and they eventually become accustomed to it. Attempts are being made to reduce these unpleasant odors to a minimum.

Grease on worker's boots or shoes coming in contact with wet floors increases the hazard of sliding and slipping, making it necessary for workers to exercise care in walking at all times. In certain sections of the plant a large number of heavy hand trucks are constantly being used for moving material and frequently cause congested traffic conditions. So far as can be determined, there are no occupational diseases in this industry.

General Coverage Jobs Pertinent:

- a. Carton Set-up, GC-1
- b. Wrapping and Packaging, GC-2
- c. Material Handling, GC-3
- d. Machine Tending, Feeding, and Off-bearing, GC-6

SLAUGHTERING AND MEAT PACKING

General Information Sheet (Contd.)Jobs Usually to be Avoided Although Seemingly Suitable:

- a. Stuffing Machine Operator
- b. Bacon Slicer
- c. Clothier
- d. Grinder (sausage materials)
- e. Pumper (hams, shoulders, and bellies)

Combination Jobs: (Jobs often combined to provide full-time employment)

- a. Leaf-fat Puller
Loin Wrapper
- b. Sausage Skinner
Bander
Packer (sausage)
Banding Machine Feeder
- c. Linker (hand)
Tier
Pan Washer
"Fast-tie" Machine Operator
- d. Stockinet Man
Stringer
Tier
Ripper
Stapling Machine Operator
Parcher
Packer (hams and bacon)

SLAUGHTERING AND MEAT PACKING

LEAF-FAT PULLER

1. Name Used for Position in Plant Surveyed: Leaf-fat Puller

D.O.T. Title: Leaf-lard Puller

Code: 8-09.11

Alternate Titles: Lard puller; leaf-fat puller; and leaf puller.

D.O.T. Definition: Grasps with both hands the end of leaf-lard strip (fat which lines the inside of the ribs) and rips strip from carcass with sudden jerk; throws strip into portable truck. May remove kidneys.

Items Worked on in Plant Surveyed: Leaf-fat (hog)

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Husky, quick and sure in movements; average mental ability.

3. Physical Demands:

a. Activities: Walking, balancing, standing, turning, stooping, reaching, lifting, throwing, pulling, handling, fingering, feeling.

b. Working Conditions: Inside, wet, noisy, adequate lighting and ventilation, moving objects, working around others.

c. Skill Required: Ability to stand all day and work rapidly with hands and arms and to accurately judge distance and location; sufficient tactual perception to differentiate between meat and fat.

4. Details of Physical Activities: Stands all day; keeps balance while standing at edge of platform, stooping slightly and reaching forward about one foot to contact moving carcass; fingers and feels fat to loosen edges of fat from carcass; with a strong jerk pulls backward and toward him to remove fat; turns to throw the fat into lard truck behind him.

SLAUGHTERING AND MEAT PACKING

LEAF-FAT PULLER (Contd.)

5. Details of Working Conditions: Works with others inside in adequately lighted and ventilated room which is damp because of constant flushing of the floor with water, and noisy because of movement of machinery and overhead conveyors; worker wears rubber boots and heavy rubber apron to protect his clothing; hands and arms in particular become dirty because of contact with recently slaughtered carcass.
6. Hazards: There is a possibility of falling from the working platform which is approximately 2 ft. high, 30 inches wide, and is continuous from one working position to the next. The worker safeguards himself by maintaining his orientation through referring to the passing carcasses as he works on them with his hands, locating the forward edge of the platform with the sole of his boot, and contacting the lard chute or truck with his other foot or the lower portion of his leg. The finger nails may be bent backwards in pulling the fat unless they are kept cut short. Scratches from protruding bones may be avoided by a careful and systematic approach to and handling of the carcass.
7. Sequence of Steps in Position in Plant Surveyed:

As the suspended carcass moves slowly past him, the worker:

- a. Reaches forward and with one hand takes hold of the lower part of the leaf while he thrusts the other hand between the leaf and the back of the hog, manipulating the fat with the fingers of both hands until the lower portion is loosened from the ribs;
- b. Holding the lower portion of fat firmly with both hands jerks suddenly upward and outward, completing the separation of the leaf from the carcass;
- c. Turns and throws it into the opening of the chute directly behind him.

NOTE: As the whole leaf is of more value than leaf scraps left on the bellies, care must be taken to remove all of it in one piece.

SLAUGHTERING AND MEAT PACKING

LEAF-FAT PULLER (Contd.)8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Overhead conveyor, disposal chute, and metal grill platform.
- b. Set-up and Maintenance: None
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants except that in some plants the fat is thrown into a box truck for removal.

10. Usual Pre-employment Training: None11. Usual Training Procedure on the Job: Foreman instructs worker in all steps of the operation.12. Any Training Deviations for the Blind: None13. Production:

- a. Full: 6,000 carcasses a day.
- b. Time to Reach Normal Efficiency: Two to three weeks.

14. Interrelation with Preceding and Succeeding Jobs: This is a line job, and each worker must complete his operation while the carcass is passing by his position.15. Teaming with Other Workers: None16. Modification, Deviation, Special Tools for the Blind: None17. Sight Requirements and Conditions:

- a. Vision Required for the Job: None
- b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: None
 2. For the Partially Sighted: The degree of lifting and amount of strain should be approved by an ophthalmologist as being compatible with the client's eye condition.

SLAUGHTERING AND MEAT PACKING

LEAF-FAT PULLER (Contd.)

18. Avoid the Following Conditions: Transfer to other jobs not suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: If the killing floor crew shifts to the trimming floor, the job of Leaf-fat Puller may logically be combined with that of Loin Wrapper.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

Slaughtering and meat packing plants where hogs are slaughtered on a production basis.

SLAUGHTERING AND MEAT PACKING

FRANKFURTER SKINNER

1. Name Used for Position in Plant Surveyed: Frankfurter Skinner

D.O.T. Title: Skin Peeler

Code: 8-09.11

Alternate Titles: Bander; frankfurter skinner; link sausage skinner.

D.O.T. Definition: A Laborer, Byproducts Operation. Changes skin-sausage to skinless by stripping casings (usually cellophane) from it with knife and hands. May place gummed bands around skinned sausage.

Items Worked on in Plant Surveyed: Frankfurters

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Any size; nimble; agile; quick arm, hand, and finger movements; average mental ability.

3. Physical Demands:

a. Activities: Standing, reaching, lifting, pushing, pulling, handling, fingering, feeling, working speed.

b. Working Conditions: Inside, cold, adequate lighting and ventilation, working with others.

c. Skill Required: Unskilled; ability to stand all day and work rapidly with hands and fingers to feel thin cellophane and to accurately nick it with a dull knife without disturbing the material which it covers, to manipulate the fingers while holding three or four frankfurters in one hand and to accurately locate items within arm's reach.

4. Details of Physical Activities: Stands all day and works rapidly with hands and arms; reaching forward pulls stuffed and linked frankfurter casings toward her; handles, fingers, and feels links to peel off the casings.

SLAUGHTERING AND MEAT PACKING

FRANKFURTER SKINNER (Contd.)

5. Details of Working Conditions: Works with others inside in adequately lighted and ventilated room which is cold because of refrigeration.
6. Hazards: It is possible to slightly puncture the hands or fingers with the knife which is used to nick the casings. This hazard is slight because the knife is very dull and the worker learns to handle it accurately and efficiently after a few days.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Worker reaches toward the center of the work table; secures a string of link-sausage which has been placed there by another worker and pulls it toward her.
 - b. Grasping one link in left hand and, using a small dull knife, cuts the casing between the links, thus separating the frankfurter from the string.
 - c. With one motion, nicks end of the casing with a knife and grips the tip of the casing between the thumb and the blade.
 - d. Simultaneously twists the frankfurter with the left hand and pulls the casing down and off with the right.
 - e. The skinned frankfurters are placed in a box for removal, and the skins are dropped into a refuse box on the floor.

NOTE: Care must be taken not to dig into the meat, as this leaves a bad appearance and affects its salability. Occasionally this worker places printed gummed paper bands around the frankfurters and also packs them neatly into boxes.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Group work table, nicking knife, refuse box, and tote box for skinned sausages.
 - b. Set-up and Maintenance: None
 - c. Modification: None

SLAUGHTERING AND MEAT PACKING

FRANKFURTER SKINNER (Contd.)9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants, except that small cardboard containers may be used instead of tote boxes for receiving skinned frankfurters.

10. Usual Pre-employment Training: None11. Usual Training Procedure on the Job: Supervisor instructs new worker in all steps of the operation. Additional coaching may be given by experienced co-workers.12. Any Training Deviations Suggested for the Blind: None13. Production:

a. Full: Seventy-five to one hundred pounds per hour depending on size and packing requirements.

b. Time to Reach Normal Efficiency: Three to six weeks.

14. Interrelation with Preceding and Succeeding Jobs: None15. Teaming with Other Workers: None16. Modification, Deviation, Special Tools for the Blind: In some plants the workers take turns in obtaining supplies of frankfurters, which serves to break the monotony of the skinning operation. If the blind person is unable to do this, she continues skinning when her turn comes. The other workers usually welcome the additional diversion.17. Sight Requirements and Conditions:

a. Vision Required for the Job: None

b. Conditions Affecting the Suitability of a Particular Job:

1. For the Totally Blind: No travel to obtain and dispose of material.
2. For the Partially Sighted: Travel requirements for the obtaining or disposal of material should be compatible with the type and amount of the worker's vision.

SLAUGHTERING AND MEAT PACKING

FRANKFURTER SKINNER (Contd.)

18. Avoid the Following Conditions: Transfer to other jobs which are not suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: Bander, packer, weigher, banding machine operator, pan washer.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

In the sausage-making departments of meat packing plants and in concerns specializing in the production of smoked meats and sausages.

SLAUGHTERING AND MEAT PACKING

SAUSAGE LINKER1. Name Used for Position in Plant Surveyed: Sausage LinkerD.O.T. Title: LinkerCode: 8-09.11Alternate Titles: Benchman; linker man; roper; sausage linker; sausage twister.

D.O.T. Definition: A Laborer, Byproducts Operation. Twists "ropes" of sausage into links of specified length; sets sausage gage according to length specified by foreman; ties one end of stuffed sausage casing with twine to prevent contents spilling out; measures length of sausage on gage, starting at tied end of casing, and presses casing between thumb and index finger at end of measured length; twirls sausage to twist casing at pressed section, forming a link; measures out and twirls remaining length of stuffed casing to make additional links; may tie together two ends of stuffed casings to make a longer string of linked sausages; cuts away defective portions of casings with knife and ties short lengths together. May drape sausages around sticks for subsequent handling.

Items Worked on in Plant Surveyed: Sausage2. Usual Operator:a. Sex: Femaleb. General Characteristics: Alert, agile, nimble fingers, quick hand movements, average mental ability.3. Physical Demands:a. Activities: Standing, turning, reaching, lifting, carrying, handling, fingering, feeling, pulling, working speed.b. Working Conditions: Inside, cold, wet, dirty, noisy, adequate lighting and ventilation, works around others.

SLAUGHTERING AND MEAT PACKING

SAUSAGE LINKER (Contd.)

- c. Skill Required: Unskilled, ability to use the fingers quickly and deftly in the twisting of sausage links, to accurately locate articles which are within arm's reach, to remember the location of objects so that they may be located without groping.
4. Details of Physical Activities: Stands all day; reaches to obtain stuffed sausage casings; pulls, handles, fingers, and feels the casings to twist them into links; carries strings of linked sausage weighing up to five pounds from one to ten feet; lifts strings of sausage to a maximum height of six feet to drape them over the bars of smoking trees.
5. Details of Working Conditions: Works around others inside in adequately lighted and ventilated area; cold because of refrigeration; wet because of wash water on tables and floors; dirty because of the continual handling of meat and casings; noisy because of the operation of near-by machinery.
6. Hazards: There is practically no hazard connected with this job except that the worker might receive a slight cut from the use of a knife in cutting strings and casings. Also the combination of wet floors and greasy shoes may result in the worker's slipping. The remedy for both of these hazards is extreme care on the part of the worker.
7. Sequence of Steps in Position in Plant Surveyed:
Operator:
 - a. Picks up a filled casing as it is ejected from a Sausage Stuffing Machine and ties it with cord;
 - b. Gauges a link by placing the end even with the left edge of the gauge and pinching the casing at the right end of the gauge;
 - c. Gauges a second link by transferring the first pinch to the left side of the gauge and making a pinch at the right side;
 - d. Quickly flips the portion between the fingers so as to twist at the pinches and form a link;

SLAUGHTERING AND MEAT PACKING

SAUSAGE LINKER (Contd.)

- e. Measures, pinches, and twists the remaining length of the casing to form it into uniform length sausage links;
- f. When the end of the casing is reached, ties the end of a new casing to it and continues to link until ten or fifteen feet of links have been made;
- g. Drapes these links over the arm and carries them to a rack which is located from one to ten feet from the work bench;
- h. Drapes the links over poles so that they hang in loops and do not touch one another;
- i. The racks are removed by another worker.

NOTE: Extreme care must be used while linking sausages, as the casings are very tender; and if too much pressure is placed on the walls, the sausage meat will break through. When casings are tied together, the loose ends are tied close to the knots. Hand linkers are fast being replaced by linking machines; nevertheless, it will be some time before the operation is obsolete.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Work table, measuring gauge, trees for hanging, and small knife.
- b. Set-up and Maintenance: None
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants.

- 10. Usual Pre-employment Training: None
- 11. Usual Training Procedure on the Job: Supervisor instructs worker in all steps of the operation.
- 12. Any Training Deviations Suggested for the Blind: None

SLAUGHTERING AND MEAT PACKING

SAUSAGE LINKER (Contd.)

13. Production:
 - a. Full: Ninety to 100 pounds an hour.
 - b. Time to Reach Normal Efficiency: Three to six weeks.
14. Interrelation with Preceding and Succeeding Jobs: Worker must not allow filled casings coming from the stuffing machine to pile up.
15. Teaming with Other Workers: Two workers often team together to hang the linked sausage on the trees.
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel outside of the immediate work area to dispose of materials.
 2. For the Partially Sighted: Travel requirements must be compatible with the client's type and amount of vision.
18. Avoid the Following Conditions: Transfer to other jobs not suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: Tier, pan washer.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

In the sausage making departments of large meat packing plants and in concerns specializing in the production of smoked meats and sausage.

SLAUGHTERING AND MEAT PACKING

BOLOGNA TIER

1. Name Used for Position in Plant Surveyed: Bologna Tier
D.O.T. Title: Bulk-Sausage-Casing Tier-Off
Code: 8-09.11
Alternate Titles: Casing tier; stuffed-casing-tier; tier
D.O.T. Definition: None
Items Worked on in Plant Surveyed: Bologna
2. Usual Operator:
 - a. Sex: Female
 - b. General Characteristics: Any size, nimble, strong fingers, average mental ability.
3. Physical Demands:
 - a. Activities: Standing, turning, reaching, lifting, handling, fingering, feeling.
 - b. Working Conditions: Inside, cold, wet, adequate lighting and ventilation, works around others.
 - c. Skill Required: Unskilled; ability to tie knots in cord while holding tension on one end; to locate articles within arm's reach quickly and accurately and to cut light cord safely with a knife.
4. Details of Physical Activities: Stands all day at work table; turns and reaches to obtain and dispose of filled bologna casings; lifts single casings weighing from one to five pounds; handles, fingers, and feels the casing and light cord to close the open end.
5. Details of Working Conditions: Works around others inside in adequately lighted and ventilated room which is cold because of refrigeration and the floors of which are wet because of frequent flushing of the work area.

SLAUGHTERING AND MEAT PACKING

BOLOGNA TIER (Contd.)

6. Hazards: The worker uses a dull knife with which to cut the cord that is used to tie the casings shut. While there is a possibility of a slight laceration from this knife, the risk is slight.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Operator stands at work table and reaches to left to obtain a stuffed bologna casing from a box which has been placed there by another worker.
 - b. Grasps the casing with the right hand and, working from the open end back, holds it closed with the fingers.
 - c. With the left hand, picks up the ends of a double thickness of cord and wraps it around the casing between the fingers of the right hand and the stuffed portion of the casing.
 - d. Using both hands, ties a half-hitch in the cord as close to the stuffed portion of the casing as possible, leaving six-inch loose length of string. (This step is facilitated as tension is held in the cord by a "tension holder" through which the string feeds.)
 - e. Brings string around and ties a second half-hitch on the opposite side of the casing.
 - f. Picks up knife and cuts the supply string approximately six inches from the casing.
 - g. Using a square knot ties the ends together, thus forming a loop by which to hang the bologna during the drying and smoking processes.
 - h. Places the closed casing in box at right for removal.

NOTE: In some plants the operators are not required to make a loop in the string, in which case it is cut off close to the casing. Workers may also be required to make a similar tie at one end of empty casings in order to make them ready for use by the stuffers.

SLAUGHTERING AND MEAT PACKING

BOLOGNA TIER (Contd.)

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Work table, small knife, tension holder.
 - b. Set-up and Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants.
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Supervisor instructs worker in all steps of the operation.
12. Any Training Deviations Suggested for the Blind: None
13. Production:
 - a. Full: 250 to 350 an hour.
 - b. Time to Reach Normal Efficiency: Two to four weeks.
14. Interrelation with Preceding and Succeeding Jobs: Stuffed casings come from the stuffing machine where they have been filled and are removed for drying and smoking. Although it is not necessary to keep exact pace with the stuffing machine operator, the worker must keep up with the output.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None

SLAUGHTERING AND MEAT PACKING

BOLOGNA TIER (Contd.)17. Sight Requirements and Conditions:

- a. Vision Required for the Job: None
- b. Conditions Affecting Suitability of a Particular Job:

- 1. For the Totally Blind: No travel to obtain or dispose of materials.
- 2. For the Partially Sighted: Travel to obtain and dispose of materials should be compatible with the client's type and amount of vision.

18. Avoid the Following Conditions: Transfer to other jobs which are not suitable for performance without the use of sight.19. Other Jobs Often Combined for Full-time Employment: Linker, Fast-tie Operator.20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

In the sausage making departments of large meat packing plants and in concerns specializing in the production of smoked meats and sausage.

SLAUGHTERING AND MEAT PACKING

FAST-TIE OPERATOR

1. Name Used for Position in Plant Surveyed: Fast-Tie Operator

D.O.T. Title: None

Code: 8-09.11

Alternate Title: None

D.O.T. Definition: None

Items Worked on in Plant Surveyed: Synthetic cellophane
bologna casings.

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Any size, alert, nimble, quick
hand movements, average mental ability.

3. Physical Demands:

a. Activities: Sitting, reaching, pushing, pulling, handling,
fingering, feeling, working speed.

b. Working Conditions: Inside, adequate lighting and venti-
lation, mechanical hazards, works around others.

c. Skill Required: Unskilled; ability to recognize shape and
contour of small objects by touch, to accurately locate
fixed positions within arm's reach, and to hold the
pleated end of a synthetic casing in one hand, insert
it into the hole of a quarter-inch metal sleeve, and
to coordinate the movements of the hands and feet.

4. Details of Physical Activities: Sits all day; reaches to secure
synthetic casings and sleeves and to dispose of "tied"
casings; places them into power press to form pleats at
end; pulls casing and fingers it to hold pleats in place
over end; inserts the assembly into another position on the
machine; depresses foot treadle to actuate machine.

SLAUGHTERING AND MEAT PACKING

FAST-TIE OPERATOR (Contd.)

5. Details of Working Conditions: Works with others inside in adequately lighted and ventilated room; mechanical hazards due to operation of air-powered press.
6. Hazards: The operator is exposed to the hazard of pinching the hand or finger in the die of the press; however, the hazard is reduced because the operator controls the motion of the press with a foot pedal. The approach to the machine should be from the bottom so that the fingers or hands will first contact the lower portion of the lower die which is stationary. Using this as a reference point and by making sure that the foot pedal is not depressed while the fingers are near the jaws of the die, the operator will be safe.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Operator picks up a synthetic casing with her left hand, inserting it between the jaws of the "pleating die" at the left side of the machine.
 - b. When she is sure that her hands are well away from the edge of the die, depresses and holds down foot pedal, closing the die to grip the end of the casing and start the formation of the pleats.
 - c. With the right hand, stretches the casing toward her.
 - d. With the left hand, grasps the "pleated casing" close up to the die, holding the pleats together between the thumb and first finger. Opens the die by removing her foot from the pedal.
 - e. Removes the casing; grasps the tip with the fingers of the right hand and pulls to set the pleats.
 - f. Secures metal sleeve with right hand from bin at right and inserts pleated tip of casing into it, making sure that the collar of the sleeve is toward the center of the casing and that the tip extends at least one-fourth inch beyond the end of the sleeve.

SLAUGHTERING AND MEAT PACKING

FAST-TIE OPERATOR (Contd.)

- g. Making sure that the sleeve remains in its proper position on the casing, slips its collar into the slot of the crimping die, thus positioning the sleeve for crimping.
- h. While keeping the hands away from the die, yet supporting the casing in the proper position with the right hand, depresses and releases foot treadle actuating the machine, crimping the sleeve to the casing.
- i. Removes the "tied casing" and places it into a box at right for removal by another worker.

NOTE: There are several sizes of casings and three different size sleeves to fit them. When the size of the casing is changed, different dies must be placed into the press to accommodate the change in size.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identifications: Hercules Air Press (two-position); bins for synthetic casing, sleeves, and completed casings; chair for worker.
- b. Set-up and Maintenance: Dies are changed and adjustments are made by a maintenance man.
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants.

- 10. Usual Pre-employment Training: None
- 11. Usual Training Procedure on the Job: Supervisor instructs new worker in all steps of the operation.
- 12. Any Training Deviations Suggested for the Blind: The blind worker should be taught to approach the machine at the bottom portion of the lower die and to use it as a reference point in order that her fingers may be kept away from the jaws when they are brought together.

SLAUGHTERING AND MEAT PACKING

FAST-TIE OPERATOR (Contd.)13. Production:

- a. Full: 550 to 650 an hour.
- b. Time to Reach Normal Efficiency: Two to four weeks.

14. Interrelation with Preceding and Succeeding Jobs: Although this job is not directly linked to the next one, steady production must be maintained.15. Teaming with Other Workers: None16. Modification, Deviation, Special Tools for the Blind: None17. Sight Requirements and Conditions:

- a. Vision Required for the Job: None
- b. Conditions Affecting Suitability of a Particular Job:
 - 1. For the Totally Blind: No travel outside the immediate work area to obtain and dispose of materials.
 - 2. For the Partially Sighted: Travel outside the work area to obtain and dispose of materials must be compatible with the client's type and amount of vision.

18. Avoid the Following Conditions: Transfer to jobs not suitable for performance without the use of sight.19. Other Jobs Often Combined for Full-time Employment: Tier20. Industries, Parts of Industries or Types of Plants Where This Particular Job is Frequently Found:

In the sausage-making departments of meat packing plants and in concerns specializing in the production of smoked meats and sausage.

SLAUGHTERING AND MEAT PACKING

STOCKINETER1. Name Used for Position in Plant Surveyed: StockineterD.O.T. Title: Stockinet ManCODE: 8-09.11Alternate Titles: Stockinet holder, washroom; stockinet tier, washroom.

D.O.T. Definition: A Laborer, Byproducts Operation. Places cured meats in cloth sacks for ease in handling during smoking or storage: Places hams, cured necks, Canadian bacon, or other cured meats in stockinets (loosely woven cloth sack); ties knot in open end of stockinet, making a loop for hanging. May insert stick through stockinets and hang them on rack. Sometimes specifically designated according to kind of meat handled, as Canadian-Bacon-Stockinet Wrapper.

Items Worked on in Plant Surveyed: Hams2. Usual Operator:a. Sex: Male (female occasionally)b. General Characteristics: Any size, strong, quick hand and arm movements, average mental ability.3. Physical Demands:a. Activities: Standing, turning, reaching, lifting, pushing, pulling, handling, fingering, feeling.b. Working Conditions: Inside, humid, wet, adequate lighting and ventilation, works around others.c. Skill Required: Unskilled, ability to handle pieces of meat weighing from five to twenty-five pounds all day long; to manipulate loosely woven cloth sacks and quickly roll them up loosely.

SLAUGHTERING AND MEAT PACKING

STOCKINETER (Contd.)

4. Details of Physical Activities: Stands all day; turns to obtain empty stockinet; reaches from one to three feet to obtain and dispose of meat; lifts pieces of meat weighing from five to twenty-five pounds; pushes, pulls, handles, fingers, and feels pieces, and the stockinet, in order to get in over the meat; fingers and feels end of stockinet to tie knot.
5. Details of Working Conditions: Works around others inside in adequately lighted and ventilated room which is humid because of the washing process. Floors are wet because of frequent flushing.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Reaches to his left and picks up a ham from the work bench where it was placed by another worker and places it in front of him.
 - b. Picks up a stockinet (loosely woven cloth bag) from a bin at his left, rolling it up loosely and stretching it slightly.
 - c. Places stockinet over butt end of ham and unrolls it, stretching and smoothing as he works until the ham is completely incased.
 - d. Ties a knot in the end of the stockinet.
 - e. Lifts the stockineted ham and places it on the far side of the work bench for removal by another worker.

NOTE: This worker places stockinets on hams, shoulders, butts, necks, and Canadian bacon. In some plants the end of the stockinet is not tied, in which case another worker bunches the end of the stockinet and places a staple into it. (Frequently, this worker is expected to participate in cleaning of the washroom, meat trees, and smoke houses.) In some plants the stockinet man places the stockinets over

SLAUGHTERING AND MEAT PACKING

STOCKINETER (Contd.)

a horn (wide, funnel-like metal apparatus) which is large enough to take up to a twenty-five-pound ham. A "thrower" throws the meat into it. The impact forces the jaws open, allowing the meat to drop into the stockinet.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Work bench and bin for holding stockinets.
 - b. Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants: The meat may be brought to the worker on a conveyor belt and taken from him by the same method. A horn is used in many plants.
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Supervisor instructs worker in all steps of the operation.
12. Any Training Deviations Suggested for the Blind: None
13. Productions:
 - a. Full: 400 to 800 an hour depending on the size of the pieces of meat and the method used.
 - b. Time to Reach Normal Efficiency: Two to four weeks.
14. Interrelation with Preceding and Succeeding Jobs: The meat comes from the brander and, after being stockineted, is hung on trees and taken to the smoke house. When meat is supplied by conveyors, it is necessary to keep pace with the other workers on the line.
15. Teaming with Other Workers: When a horn is used, a "thrower" and one or two stockinet men work as a team.
16. Modification, Deviation, Special Tools for the Blind: None

SLAUGHTERING AND MEAT PACKING

STOCKINETER (Contd.)17. Sight Requirements and Conditions:a. Vision Required for the Job: Noneb. Conditions Affecting Suitability of a Particular Job:

1. For the Totally Blind: No responsibility for clean-up.

2. For the Partially Sighted: Clean-up responsibility must be compatible with the client's type and amount of vision.

18. Avoid the Following Conditions: Transfer to other jobs which are not suitable for performance without the use of sight.19. Other Jobs Often Combined for Full-Time Employment: Sticker, Stapler, Cellophane Tier.20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

In the sausage making departments of large meat packing plants and in concerns specializing in the production of smoked meats and sausage.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D. C.

OVR 33:58:B:5

March 10, 1949

REHABILITATION SERVICE SERIES NUMBER 58--SUPPLEMENT 3

TO: Divisions of Vocational Rehabilitation (in States with no
separate agency for the blind); Commissions and Other
Agencies for the Blind

SUBJECT: Supplement to Handbook of Representative Industrial Jobs
for Blind Workers--Category SI-4, Dairy Products

The attached material on the Dairy Products industry is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as the fourth category in Part I, Specific Industry Series. It describes a few of the jobs in this industry and is not intended to be all inclusive of all possibilities for blind workers. Like the jobs described in the first issue, those in this category have been observed and tested by a blind member of the staff of the Division of Services to the Blind.

Other categories of job specifications are being prepared and will be forwarded to you at an early date. Additional copies of the Handbook or any of its supplements will be furnished upon request. We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

D. H. Dabelstein
Donald H. Dabelstein
Assistant Director

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRY SERIES

Category SI-4

DAIRY PRODUCTS

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The above list only partially represents the employment opportunities for blind persons in this category, and specifications for others will be issued as circumstances permit. Additional jobs such as the following should be sought, and all jobs must be carefully analyzed for suitability under the conditions found in a particular plant:

Casing Off Milk Bottles and Cartons

Molding Cheese

Wrapping and Packing Ice Cream Novelties

Stripping Cheddars of Cheese

Dumping Milk Cans

Repairing Cases



HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRY SERIES

DAIRY PRODUCTS

General Information Sheet

Character of the Industry: Milk is a fluid food consisting of 13% of solids, wholly or partially dissolved in 87% of water. Its solids contain protein, sugar, and fat. In addition, it contains all the vitamins from A to G. The total flow of milk approximates 11 billion gallons per year or nearly 100 billion pounds. Various foods result as end products from this enormous flow. The lighter, richer elements are first separated off and sold as cream, but about one-half of the milk is sold as ordinary bottled milk. Forty percent is sold as butter, and the balance becomes cheese; ice cream; malted, condensed, evaporated, and skimmed milk; casein; and other products.

Milk processing plants may be no more than farm plants turning out bottled milk products and operated by the dairy farmer and his family, or they may be immense plants employing hundreds of workers turning out many special products and incorporating activities such as the manufacture of cheese, butter, and/or ice cream. Butter is made in milk-processing plants, in produce concerns, or in creameries. Likewise, cheese is manufactured in many types of plants. Cottage cheese is more strictly an operation of the milk-processing plant and is seldom, if ever, produced in cheese factories. The typical small cheese factory is a country plant capable of processing daily 5,000 pounds of milk into Cheddar or American cheese. The larger plants may make several types of basic cheeses and grind and blend them into the many familiar kinds of cheese foods and cheese spreads. Malted milk, dried skim milk, condensed and evaporated milk, and commercial casein are usually produced in large specialized plants which are located in exceptionally good dairying districts where the supply of whole milk exceeds the demand within the area. The ice cream industry is very often found as a department of a milk-processing plant or a general creamery. Plants range in size from the very large producers employing several hundred workers to the very small counter freezer units found in confectionery and drug stores.

DAIRY PRODUCTS

General Information Sheet (Contd.)

Distribution of the Industry: The industries, because the perishable and bulky items they handle are consumer goods, blanket the entire country in a fairly balanced proportion to the population. Variations from this general rule should be noted, however. Large metropolitan areas such as New York City must draw milk from hundreds of miles in order to satisfy the demands for whole milk. Thus, butter and cheese processing is practically non-existent. Large dairying regions with no great metropolitan demand for whole milk, such as those found in Iowa, Minnesota, Missouri and Wisconsin, convert the milk into cheese, butter, condensed, powdered or evaporated milk, or other less profitable products which are easier to transport and less subject to spoilage.

Type of Workers Usually Employed: There is a tremendous variation in the type of workers employed. Because of the bulky, heavy nature of the majority of the work, male employees who are strong and husky predominate. Men with less physical stamina are employed as truckers, drivers and production men. Females are usually hired to do the light wrapping, packing, and inspection jobs where speed and manipulative ability are required.

Working Conditions: Production work is inside well-lighted and ventilated plants. Temperatures vary from hot and humid in sterilizing, pasteurizing, and the preparation rooms to damp and cold in storage rooms. In milk processing, ice cream, butter and cheese plants, frequent sluicing causes floors to be wet and slippery. Most plants are quite noisy due to the operation of machinery and the clatter of cans, jars, and bottles. Day time work prevails for the majority of the employees in this industry. In milk processing plants hours of work are usually longer than in the other branches of the industry. These plants are open 24 hours a day. However, the production workers are generally employed on over-lapping shifts which run from 5:00 a.m. to 10:00 p.m. Union contracts are in force in most plants and in most instances union leaders have been favorable to the employment of the blind.

Safety Precautions, Health Conditions, Hazards: The industry is not considered to be particularly hazardous. Cuts from broken bottles, strains from lifting heavy cans and cases, falls on slippery floors, and pinching hands or fingers between heavy cans and cases are the chief hazards to which the worker is exposed. Most production workers wear canvas gloves when handling glassware, thus reducing the number of cuts. Training programs teach the workers how to lift heavy

DAIRY PRODUCTS

General Information Sheet (Contd.)

weights properly, and wearing cleated or ribbed soled shoes has reduced the number of falls on slippery floors. Unless the workers are dressed properly, arthritis or rheumatism may be caused or aggravated by working in cold, damp storage rooms. Workers in cheese and butter plants frequently suffer from skin eruptions, which apparently are caused from handling the product.

General Coverage Jobs Pertinent: The majority of jobs which can be performed in this industry by persons with little or no sight are of a nature which is common to many unrelated industries, hence they will be described in the General Coverage Categories (Part II) of this Manual. Particularly in cheese, butter and ice cream plants, suitable jobs may be limited to Carton Set-Up (GC-1), Wrapping and Packaging (GC-2), and Material Handling, Machine Feeding and Off-Bearing (GC-3) jobs. Such jobs as boxing ice cream novelties, setting up ice cream or cheese cartons, packing pounds of butter into cases and feeding "cut brick" machines are quite similar to boxing lollypops, setting up cracker boxes, placing coffee cans into cases, and feeding cake wrapping and slicing machines.

Jobs Usually to be Avoided Although Seemingly Suitable: Many jobs which may appear to be suitable for performance without the use of sight prove to be impractical because of the element of inspection which is present in so many of the jobs in this category. Bottle washing, butter wrapping, casing milk bottles, lidding ice cream cans, and wrapping cheese are examples.

Combination Jobs: (Jobs often combined to provide full-time employment) It should be borne in mind that especially in ice cream plants, workers are frequently moved from one job to another regardless of the department in which the jobs are located and, therefore, employment counselors should investigate the possibility of the existence of this condition when they are making their plant surveys. For example, a stick machine operator or stick pusher in the novelty department may be moved when the work is slack in that department to such jobs as the boxing of ice cream slices, bagging cups, setting up pint cartons, or assembling paper cans. To a lesser degree this condition also exists in butter, cheese and milk processing plants.

DAIRY PRODUCTS

CASE STACKER1. Name Used for Position in Plant Surveyed: Case StackerD.O.T. Title: Stacker IIICode: 9-63.02Alternate Titles: Box man, cooler man, cooler room man,
refrigerator man.D.O.T. Definition: Stacker III; ice box man who stacks filled
cases in storage room.Items Worked on in Plant Surveyed: Filled cases of bottled milk.2. Usual Operator:a. Sex: Maleb. General Characteristics: Tall, strong, husky, agile, average
mental ability. Negro workers are often employed for
this position.3. Physical Demands:a. Activities: Walking, standing, turning, reaching, lifting,
carrying, handling, talking, hearing, object and color
perception.b. Working Conditions: Inside, cold, adequate lighting and
ventilation, working with others.c. Skill Required: Unskilled; ability to retain verbal
instructions and to stack heavy items evenly.4. Details of Physical Activities: Stands all day and works
rapidly with hands and arms; frequently walks up to 300 feet
from one part of the cooler to another; using both hands
reaches forward at waist height to lift cases weighing up
to 50 pounds from moving conveyor; turns and carries them
a distance of from 2 to 15 feet; handles and arranges cases
in stacks up to 8 feet in height; talks with and listens to
others to exchange necessary information; observes color of
bottle hoods and/or the color of the printing on them to
determine the nature of the contents of the bottle.

DAIRY PRODUCTS

CASE STACKER (Contd.)

5. Details of Working Conditions: Works with others inside in adequately lighted and ventilated area which is cold (40 degrees Fahrenheit) because of refrigeration.
6. Hazards: Worker is exposed to injury from falling cases which may be dropped by himself or others. A slippery spot on the floor created by the contents of a broken bottle or leaky carton may cause a fall. This hazard will be reduced if the worker wears cleated shoes. The worker should be properly dressed to work in a 40 degree temperature in order to avoid an excessive number of colds or to reduce the possibility of getting arthritic or rheumatic conditions. In order to avoid injury, even the strong, husky worker should receive instruction in proper methods of handling heavy objects.
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Stands with from one to four fellow stackers at the side of a chain conveyor and selects, according to the color of the printing on the bottle hood, the particular type of milk he is stacking from the moving conveyor which is bringing filled cases of several types of milk from the bottling room.
- b. Lifts the case from the conveyor and sets it on the floor from two to fifteen feet away depending on the number of cases he is to store in that section.
- c. Continues to select cases from the conveyor and stacks them in even rows about eight feet high until the prescribed number has been stored.
- d. Either remains in the same section and stacks another type of milk, or moves to another part of the cooler, and continues to stack in the same manner as before.

NOTE: The amount of storage space will determine the height to which the cases are stacked; the height generally preferred is six feet, but crowded conditions often make it necessary to stack to a height of eight feet in order that enough milk may be stored to fill the next day's orders.

DAIRY PRODUCTS

CASE STACKER Contd.)8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Chain conveyor
- b. Set-up and Maintenance: None
- c. Modification: None

9. Equipment Variations Which may be Found in Other Plants:

Roller gravity or belt conveyors are used in some plants.

10. Usual Pre-employment Training: None11. Usual Training Procedure on the Job: Supervisor instructs the worker in all steps of the operation and team mates pass on additional suggestions from time to time.12. Any Training Deviations Suggested for the Blind: None13. Production:

- a. Full: 400 to 600 cases per hour.
- b. Time to Reach Normal Efficiency: One to three weeks.

14. Interrelation with Preceding and Succeeding Jobs: Cases must be stacked in the proper order so that there will be no delay in loading the route trucks.15. Teaming with Other Workers: From two to six men work in a team. Before starting to stack, the men agree on the type of milk each is to handle.16. Modification, Deviation, Special Tools for the Blind: None17. Sight Requirements and Conditions:

- a. Vision Required for the Job: Color perception at 5 feet, and object perception at 15 feet with artificial light.
- b. Conditions Affecting Suitability of a Particular Job:
 - 1. For the Totally Blind: Not suitable.
 - 2. For the Partially Sighted: Travel requirements; ability to recognize objects and to distinguish colors, and the degree of lifting must be compatible with the eye condition and the type and amount of the worker's vision.

DAIRY PRODUCTS

CASE STACKER (Contd.)

18. Avoid the Following Conditions: Transfer to other jobs which the worker's eye condition, type and amount of vision will not permit him to perform.
19. Other Jobs Often Combined for Full Time Employment:
Inside loader. (Loads cases on conveyor moving toward loading platform)
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:
Milk processing plants.

DAIRY PRODUCTS

PAPER CAN ASSEMBLER1. Name Used for Position in Plant Surveyed: Paper can assemblerD.O.T. Title: Can AssemblerCode: 9-63.03Alternate Titles: Container maker, ice cream

D.O.T. Definition: Assembles round paper ice cream containers by hand, with an assembly jig; opens large cartons of unassembled paper cans; places a tubular section over a cone-shaped jig and inserts a bottom piece into the tube; presses pedal to clamp bottom in place; releases pedal; removes assembly can and stacks it at one side with others to remove to filling machine. May fix bottom in place by pressing it in by hand.

Items Worked on in Plant Surveyed: 2-1/2 gallon paper cans.2. Usual Operator:a. Sex: Femaleb. General Characteristics: Any size, agile, nimble, quick arm, hand and finger movements, average mental ability.3. Physical Demands:a. Activities: Walking, standing, turning, reaching, lifting, pushing, handling, fingering, feeling, talking, hearing.b. Working Conditions: Inside, adequate lighting and ventilation, working around others.c. Skill Required: Unskilled; ability to stand all day and work rapidly with hands and arms to coordinate hand and foot activities, to orient within an area of at least 15 square feet and to locate items within arm's reach quickly and accurately.4. Details of Physical Activities: Stands all day and works rapidly with hands and arms; frequently walks a distance of approximately 15 feet to secure cartons of materials; lifts and carries weights up to 5 pounds a distance of approximately 15 feet; continually turns and reaches to secure and dispose of materials; handles, fingers and feels component parts of the assembly and pushes them into position; listens and talks to others to exchange necessary information.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

DAIRY PRODUCTS

PAPER CAN ASSEMBLER (Contd.)

5. Details of Working Conditions: Works around others, inside in adequately lighted and ventilated area.
6. Hazards: There are no particular hazards except that the worker might receive slight finger cuts from the sharp edge of the metal bottom ring.
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Drops a metal ring flat side down into the assembly jig.
- b. Depresses foot pedal to close the assembly jig.
- c. Opens flattened can body, forming it into a cylinder and, with a quick downward thrust, forces it into the assembly jig with printing right side up, making sure that its lower edge fits into the bottom ring.
- d. Inserts a bottom disc into the cylinder, waxed side down, and presses it all the way down.
- e. Presses the bottom disc down firmly by running a shaping tool completely around its edge.
- f. Releases foot pedal to open jig, and removes completed paper can.
- g. Places can on conveyor belt for removal to the filling machine operator.

NOTE: The worker is frequently required to secure his own material (consisting of can bodies, bottom rings and bottom discs), which is generally stored near-by and is easily accessible to a well oriented blind person. The work is performed in a quiet area, thus permitting the worker to find his location with minimum confusion.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Assembly jig, forming tool, conveyor belt.
 - b. Set-up and Maintenance: None
 - c. Modification: None

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

DAIRY PRODUCTS

PAPER CAN ASSEMBLER (Contd.)9. Equipment Variations Which May Be Found In Other Plants:

Substantially the same in all plants except that chutes or trucks may be used for the removal of completed cans.

10. Usual Pre-Employment Training: None11. Usual Training Procedure on the Job: Supervisor instructs worker in all steps of the job.12. Any Training Deviations Suggested for the Blind: The employment counselor should instruct the worker how to tell when the printing on the can body is right side up, by observing the direction in which the body seam is lapped when a can is assembled correctly. The bodies are usually packed within the lettering on every body facing the same direction. All that the worker has to do is to check the seam lapping on the first body in order to know how to stack the remainder of the bodies so that she will always pick them up in the correct position for assembling.13. Production:

a. Full: 225 to 250 per hour.

b. Time to Reach Normal Efficiency: Two days to one week.

14. Interrelation with Preceding and Succeeding Jobs: It is the responsibility of the can assembler to see that a steady supply of cans is furnished to the filling machine operator. A reserve may be built up in order to cover those periods when it is necessary to leave the jig in order to secure additional material.15. Teaming with Other Workers: None16. Modification, Deviation, Special Tools for the Blind: None17. Sight Requirements and Conditions:

a. Vision Required for the Job: None

DAIRY PRODUCTS

PAPER CAN ASSEMBLER (Contd.)b. Conditions Affecting the Suitability of a Particular Job:

1. For the Totally Blind: No travel to secure and dispose of materials beyond a reasonably quiet work area which is free from moving trucks.
 2. For the Partially Sighted: Travel requirements for the securing and disposal of material as well as the degree of lifting should be compatible with the eye condition and the type and amount of the worker's vision.
18. Avoid the Following Conditions: Transfer to other jobs which are not suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full Time Employment:
- Carton set-up (especially pint cartons) and wrapping and packaging jobs.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:
- Ice cream plants or ice cream departments of milk processing plants.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

DAIRY PRODUCTS

STICK INSERTING MACHINE OPERATOR

1. Name Used for Position in Plant Surveyed: Stick Inserting Machine Operator

D.O.T. Title: Sticker

Code: 8-06.01

Alternate Titles: Stick Holder Filler

D.O.T. Definition: A Laborer Process. Inserts small wooden sticks that serve as handles for ice cream and frozen confections, into frames or holders for use of stick machine man; pushes lever to open locking device and pulls lever to lock sticks into position.

Items Worked on in Plant Surveyed: Sticks for ice cream novelties.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, agile, strong arms, quick arm and hand movements, average mental ability.

3. Physical Demands:

a. Activities: Standing, turning, reaching, lifting, pushing, pulling, feeling, fingering, handling, talking, hearing.

b. Working Conditions: Inside, adequate lighting and ventilation; working around others.

c. Skill Required: Unskilled; ability to locate accurately items within arm's reach.

4. Details of Physical Activities: Stands all day, working rapidly with hands and arms; continually turns and reaches with both arms a distance of approximately three feet to lift stick holder weighing approximately 5 pounds from receiving table to machine and from machine to disposal table; pushes and pulls stick holder to position it correctly and to operate a stick inserting machine; fingers and feels sticks to load machine and to straighten sticks if they jam; talks with and listens to others to exchange necessary information.

5. Details of Working Conditions: Works with others inside in adequately lighted and ventilated room.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

DAIRY PRODUCTS

STICK INSERTING MACHINE OPERATOR (Contd.)

6. Hazards: There are no particular hazards to be noted in this job.

7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Using both arms lifts a stick holder, which has been delivered by conveyor belt, from a table at his right and places it side down on the table of the stick inserting machine.
- b. Making sure that the lever which controls the stick locking mechanism is in the open position, pushes stick holder against the right hand guide bar of the machine.
- c. Keeping a slight pressure toward the right, pushes stick holder forward, actuating the machine which inserts one stick into each of the 24 apertures of the holder.
- d. Pushes lever on stick holder to the closed position, thus locking the sticks in place.
- e. Removes filled holder and places it on the table directly behind him for removal by the stick machine operator.

NOTE: The operator is usually supplied with cases of sticks by a service man.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Stick holders, stick inserting machine, conveyor belt, work tables.
- b. Set-up and Maintenance: The worker is required to load his own machine with sticks to keep the guides full and to make minor adjustments when the sticks fail to feed properly.
- c. Modification: None

9. Equipment Variations Which May Be Found in Other Plants:

In some plants the stick holders are filled by hand, in which case the worker places the holder, handles up, in a frame, drops the sticks individually into the apertures, which are slightly flared at the top, and locks the sticks in place by pushing a lever. Power driven inserting machines, which can be operated without the use of sight, are replacing the manually operated ones. Chutes or conveyor belts are often used for the removal of stick holders.

DAIRY PRODUCTS

STICK INSERTING MACHINE OPERATOR (Contd.)

10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Supervisor instructs the worker in all steps of the operation.
12. Any Training Deviations Suggested for the Blind: The employment counselor should instruct the worker to observe the bottom of a filled stick holder occasionally (at least every 20th holder) to make sure that all the apertures are being filled.
13. Production:
 - a. Full: 175 to 200 stick holders per hour.
 - b. Time to Reach Normal Efficiency: Two days to one week.
14. Interrelation with Preceding and Succeeding Jobs: Worker must keep stick holders filled as they come to him in order that the stick machine operator may have filled holders available to cover the mold pans before they enter the brine tanks.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: None
 2. For the Partially Sighted: None
18. Avoid the Following Conditions: Transfer to other jobs not suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full Time Employment: When the work in the novelty department is for less than a full day, this worker may be assigned to enter a department where he could perform such jobs as setting up cartons or wrapping and packaging operations.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

Ice cream plants or the ice cream novelty department of a milk processing plant.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D. C.

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Supplement 8

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REHABILITATION SERVICE SERIES NUMBER 58 • SUPPLEMENT 8

To : Divisions of Vocational Rehabilitation (in States with no separate Agency for the Blind); Commissions and Other Agencies for the Blind

Subject: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category SI-5, Mattresses and Bed Springs.

The attached material on jobs in the Mattress and Bed Spring industry is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers, as the 5th category in Part I, Specific Industry Series. It describes a few of the typical jobs frequently found in the industry suitable for performance without the use of sight. Like the jobs described in the previous issue, those in this category have been observed and tested by a blind staff member of the Division of Services to the Blind.

Other categories of job specifications are being prepared and will be forwarded to you at an early date. Additional copies of the Handbook, or any of its supplements, will be furnished upon request.

We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

Donald H. Dabelstein

Donald H. Dabelstein
Assistant Director

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRY SERIES

Category SI-5

MATTRESSES AND BED SPRINGS

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The above list only partially represents the employment opportunities for blind persons in this category and specifications for others will be issued as circumstances permit. Additional jobs, such as the following, should be sought and all jobs must be carefully analyzed for suitability under the conditions found in a particular plant.

Tufting Machine Operator	Garnet Machine Operator
Roll Edger Machine	Wrapping and Casing Mattresses
Roll Edger Hand	Tearing Down
Innerspring Unit Assembler	Picking Machine Operator
Coil Maker and Wire Bender	Day Bed Upholsterer

HANDBOOK OF.
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

MATTRESSES AND BED SPRINGS

General Information Sheet

Character of Industry: This industry is concerned primarily with the manufacture of various forms of mattresses, bed springs, pads, spring cushions, and with the renovation of mattresses. Plants engaged in this business vary in size from those employing 4 or 5 workers to those employing 400 or 500 in one plant. Some companies have a number of plants significantly located in different parts of the country. The smaller plants frequently make a variety of types and sizes of mattresses and do renovating according to customers' orders. In the larger plants there is a higher degree of specialization and standardization on a smaller number of items. The output of these larger plants may be marketed under their own label or sold under the brand of a larger retail chain outlet. Other plants are franchised to manufacture, according to standard specifications, nationally advertised brands of mattresses. In a few sections of the country plants will be found which manufacture only parts, such as coil springs and cross-ties to sell to companies doing assembling only.

Mattresses consist of a casing known as a tick, and a filler which will vary in type. They may be classified according to filler as cotton (blown or felted), sisal, hair or innerspring. There is sometimes a combination of hair and cotton filler. The blown type cotton mattress is made by blowing a given weight of fluffed-up cotton direct from the picking machine into the tick, then evenly distributing it to form a mattress. The felted type cotton mattress is made by placing layer upon layer of felt from the Garnet machine until the desired thickness has been secured. The filler for the innerspring mattress consists essentially of a layer of coil springs protected on each side by a covering of sisal cloth and a layer of cotton felt above and below the springs and around the edges. The whole is then inserted in a tick. Mattresses come in four sizes: single, twin, three-quarter, and double bed widths.

Virtually all types of mattresses have certain major steps in common in their production, such as making a tick, arranging the filler, inserting the filler in the tick, closing the tick at the ends or sides, edging (tape or roll) and tufting by tying through from top to bottom to retain the filler in the proper shape. The carefulness with which the work is done, the quantity and quality of material used, determine the over-all quality of the mattress. The innerspring units vary considerably in design with some of them being patented and sold to the mattress

MATTRESSES AND BED SPRINGS

General Information Sheet (Contd.)

manufacturer as assembled units. Some companies manufacture the parts of their bed springs and innerspring units, such as coils, bending frames, and making cross-ties. Others buy these parts already fabricated and merely assemble the units.

The mattress plants, large or small, may be thought of in terms of the following departments: The cotton processing where the molt or linters are picked, cleaned and garneted; the sewing where the ticks are cut, assembled and sewed; the filling where the cotton and innerspring units are assembled and inserted in the tick; and the finishing where the mattresses are closed, edged, tufted, and packaged ready for shipment.

Plants doing renovating are generally too small to be organized formally into departments but the work to be done can be naturally divided into the same functions. The old mattresses are received and sterilized before the tick is ripped open and the contents dumped on the floor. The filling material then goes into the cleaning and picking machine, from which it is blown into the Garnet machine where it is made into felt, which is then laid out into the proper shape to be inserted in the new tick. In renovating a mattress it is usually necessary to add new cotton to bring the total weight up to specification. From this point the finishing process is the same as for a completely new mattress of similar type.

Bedsprings fall essentially into two groups, the box spring and the steel spring types. The first consists of a wooden frame with transverse slats. The spring coils are stapled by their bottom loop to the slats at regular intervals. Heavy cord is then used to tie the springs together at the top and sometimes in the middle, in order to preserve their spacing and vertical position. The ends of the cord are fastened to the wooden frame. There are different patterns of tying and different types of knots are used. The more elaborate tying gives longer life and preserves the shape better, while other patterns are used when low cost of production is the most important factor. After the coils have been tied in position, the top and edges are covered with sisal cloth and cotton felt. A tick is pulled over the assembly and tacked to the bottom of the wooden frame. The assembly is finished off by tacking a light cloth over the bottom.

Steel springs are those on which the coils are supported on a steel frame often made of angle iron. The coils are fastened to this frame and held in position by cross-ties of

MATTRESSES AND BED SPRINGS

General Information Sheet (Contd.)

solid wire, spirals, or short helical tension ties. There are many designs and combinations (both single and double deck) in this type of spring unit, according to each manufacturer's preference and the type of service for which it is designed. Spring units are usually edged with a frame made of solid rod. The design and process of constructing the innerspring units for mattresses are essentially the same as for bed springs, except that they are usually lighter and without the rigid frame. Often the building of these units is done in the same department as the steel springs.

The same principles and practices are found in all parts of the country, with some plants still using old equipment and hand methods, while in the same areas small and large plants may be found which are highly modernized and extremely conscious of production costs for each step in the process. While general principles are the same throughout the industry, each plant may have its own variations in the use of power sewing equipment, tufting machines, jigs and fixtures to facilitate manufacturing processes. The size of the plant will not necessarily indicate the type of equipment, as many small plants are as modern in character as the big ones.

Some plants make side lines, such as day beds and couches on which the majority of the operations are similar to those in the manufacture of bed springs. In addition a number of upholstering operations may be required. The side lines may also include making spring-filled cushions or spring cushion units for the automobile trade.

Distribution of the Industry: Any medium or large size community will have some representation of the mattress and bed spring industry, at least a renovating shop. The census of 1939 shows that there were 947 different business establishments in this industry exclusive of renovating shops, with the States of California, Illinois, Massachusetts, Pennsylvania, and Texas each having over 50 plants, while only four States had as few as one plant each. Renovating job shops may be found by reference to the classified telephone directory of the local community, while the larger manufacturers may be identified through inquiry at the purchasing departments of furniture stores.

Type of Worker Usually Employed: The majority of workers in this industry are not highly skilled nor extensively trained before entering it. Many employers state that they are perfectly

MATTRESSES AND BED SPRINGS

General Information Sheet (Contd.)

agreeable to hiring unskilled workers, the only requirements being that they be in good physical condition, able to speak, read and write English, and in some areas the language requirements may be eliminated also. In southern areas a considerable amount of the work is done by colored labor. The usual worker is one who is in good physical condition, suitable for medium or light work of a fast and monotonous nature, and capable of learning to perform one or two tasks involving a limited number of physical activities, with ability to develop a high degree of repetitive skill.

Smaller shops may be owned and operated by a man who is a skilled journeyman, upholsterer and mattress maker, and who handles all the skilled parts of the processes himself, employing semi-skilled or common laborers, apprentices, and helpers for the balance of the work. Some plants set the preferable age range from 18 to 35 for women, and 20 to 40 for men workers. Men are employed almost exclusively in the smaller shops, where a large variety of operations must be performed by the same worker, while in the larger plants where a higher degree of specialization exists, a greater proportion of women workers are used.

Working Conditions: Employment in this industry is reasonably steady with only slight seasonal variations to cause layoffs. Some plants report a Spring and Fall peak, with the low in the middle of the Summer. However, the figures show a steady rise from the lowest production in January to the highest production in October, the lowest being 6.8 per cent below the average, and the maximum 8.6 per cent above the average. Wages are low to medium as most of the work does not require a high degree of judgment. Working conditions with respect to plant lay-out, comfort, health and labor-saving devices are reasonably good in most cases. A large portion of the industry is unionized.

Safety Precautions, Health Conditions, Hazards: There are very few serious hazards, injuries being limited mainly to the fingers from cutting with knives or needle points, snagging on wires, or bruising with the hammer while tacking down. In order to insure the safe operation of such equipment as sewing, edging, and coil-forming machines, often considered to be hazardous, it is necessary for the blind person to establish and follow a safety pattern. The sewing and finishing departments and often the filling department are usually well lighted and reasonably free from dust. The cotton processing department is usually very linty and dusty, except in plants where dust collecting and ventilating equipment has been installed.

MATTRESSES AND BED SPRINGS

General Information Sheet (Contd.)

General Coverage Jobs Pertinent: Carton Set-up jobs - GC-1, such as making cartons for receiving nested coil springs and other components to be shipped to assemblers.

Wrapping and Packaging jobs - GC-2, such as inserting mattresses in large corrugated cardboard containers; nesting and packing coil springs and other components in shipping cases; compressing and crating innerspring units.

Material Handling jobs - GC-3, such as trucking and stacking mattresses and bedsprings; bringing in supply of parts to production workers when compatible with worker's type and degree of vision.

Machine Operating jobs (woodworking power tools) - GC-4, such as cutting slats and parts for box spring frames and crates.

Machine Operating jobs (punching and forming) - GC-7, such as punching holes in angle iron, straps and braces, stamping and forming angles, and other support parts; bending edge wire frames and cross-ties; winding coils.

Combination Employment: (Jobs often combined for full-time employment)

Depending on the size and specialization of the product, many combinations of jobs may be found necessary for full-time employment. An operator in the cotton processing department may be required to do all the work from opening bales, through the operation of the picketing and garneting machines, and may help with the filling process. The picking, operating, and the filling may often be combined, or the filling and the closing. Another frequent combination is closing, edging, and tufting. In many renovating shops the worker does the work all the way from the ripping of the old tick, through the operation of the various machines, to the finishing and wrapping of the completed mattresses.

Jobs Usually to be Avoided Although Seemingly Suitable:

Closing and edging machine operations where matching or straightening strips is required; inserting spiral cross-ties with power equipment; and sewing ticks.

MATTRESSES AND BED SPRINGS

BEATER1. Name Used for Position in Plant Surveyed: Beater

D. O. T. Title: Beater II (Laborer Process)
(Mattress and bed springs)

Code: 8-36.61

Alternate Titles: Beat-out man; beater, hand; beater, machine;
beater-out.

D. O. T. Definition: A Laborer, Process. Evens out the padding of filled and closed mattresses by hand or machine (1) lays mattress flat on table; strikes mattress with heavy pole to beat and level padding, starting at center and working out to corners; brushes and smooths beaten padding with hands or pole; turns mattress over and smooths other side; (2) lays mattress on machine table; pulls beater head down to mattress, starts machine, and pushes table around under head to beat all parts of mattress; turns over and beats other side.

Items Worked on in Plant Surveyed: Mattresses

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, husky, low, or average mental ability.

3. Physical Demands:

a. Activities. Standing, walking, turning, reaching, lifting, handling, feeling.

b. Working Conditions: Inside, dusty, noisy, adequate lighting and ventilation, working around others.

c. Skill Required. Unskilled: Ability to orient to working position; locate striking position and to judge, quickly and accurately by feel, the smoothness and evenness with which the material is distributed.

4. Details of Physical Activities: Stands all day, turns and lifts mattress weighing approximately 50 pounds to or from the stack and places on beater table; swings beater club, bends, reaches, strikes and feels to distribute filler evenly and determine results of beating; walks four or five steps and stacks.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

MATTRESSES AND BED SPRINGS

BEATER (Contd.)

5. Details of Working Conditions: Works inside and around others in adequately lighted and ventilated room which is noisy from pounding of beater machines and pickers, and dusty because of lint from filler.
6. Hazards: Hands may become blistered from the constant handling of the beater which may be lessened by taping the thumb and cushion part of the hand. The nostrils and lungs of some individuals are irritated by lint from the filler. This may be overcome by wearing a respirator.
7. Sequence of Steps in Position in Plant Surveyed:
Worker:
 - a. With both hands picks up mattress and places on beater table.
 - b. Locates center with both hands and flattens by rubbing it with both hands, in opposite directions toward each end.
 - c. Picks up beater, locates position in center of work, and strikes in a downward and outward direction toward each end, feeling with one hand to make certain that the filler is being evenly distributed and filling all corners.
 - d. Turns mattress over and repeats process.
 - e. Picks up, walks four-five steps and stacks.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Beater table = 7' long, 5' wide and 32" high with smooth surface top. Beater pole approximately 5' long and 2" in diameter.
 - b. Set-up and Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants: None
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Foreman or an experienced beater instructs new workers.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

MATTRESSES AND BED SPRINGS

BEATER (Contd.)

12. Any Training Deviations Suggested for the Blind: None
13. Production:
 - a. Full: 40 per day.
 - b. Time to Reach Normal Efficiency: 4 to 5 days.
14. Interrelation with Preceding and Succeeding Jobs: Beater is required to beat-out the work coming from the picker and his production affects the succeeding operation of tufting. However, there is usually a considerable reserve supply of mattresses between each operation.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: Excessive travel outside the work area to secure and dispose of material.
 2. For the Partially Sighted: Lighting conditions, travel requirements, degree of lifting and susceptibility to dust should be compatible with the type, amount of vision and eye condition of the worker.
18. Avoid the Following Conditions: Transfer to other jobs that have not been approved as suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: Operating picker; tearing down; lacing down; and toll edging (either hand or machine)
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Mattress, spring and bedding factories; renovating shops; upholstery shops, and second hand stores.

MATTRESSES AND BED SPRINGS

CHAIR SPRING ASSEMBLER

1. Name Used for Position in Plant Surveyed: Clamper, chair spring assembler.

D. O. T. Title: Spring assembler

Code: 6-36.411

Alternate Titles: Coil placer, coil spring assembler; spring builder; spring man; spring rod-assembler; spring tier (furniture; mattresses and bedsprings).

D. O. T. Definition: Assembles and fastens coil springs together in a spring frame to form bedsprings or chair-seat springs; lays a bed of crossed wiring or slats in frame, and twists, clinches, or wires bottoms of coil springs to slats or wires; secures tops of coils together with tie wires of metal clips; clips edge wire to tops of outside coil springs; cuts off and bends under any surplus or protruding ends of wires. May secure into the frame sub-assemblies of coil springs that have been previously tied together. May be specifically designated according to kind of furniture, as Bedspring Assembler; Chair Spring Assembler; Mattress Spring Assembler II.

Items Worked on in Plant Surveyed: Seat spring units (chairs and automobile cushions).

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Short, quick, average mental ability, suitable for fast, monotonous work.

3. Physical Demands:

a. Activities: Standing, turning, reaching, lifting, pushing, pulling, handling, fingering, feeling, working speed.

b. Working Conditions: Inside, noisy, adequate lighting and ventilation, mechanical hazards, working around others.

c. Skill Required: Semi-skilled; ability to manipulate small parts and wire rapidly, maintaining good finger, hand, and foot coordination, and orientation within arm's reach.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

MATTRESSES AND BED SPRINGS

CHAIR SPRING ASSEMBLER (Contd.)

4. Details of Physical Activities: Stands all day and reaches at arm's length to left or right to obtain or dispose of spring units and parts; lifts spring units weighing up to 15 pounds to place them in working position, and pushes them across top of table when finished; handles wire frames the size of the cushions to place them in working position, and handles coils and frames as a unit to place them and hold them in the crimping machine; fingers and feels partially formed clip to place it properly in the jaws of the crimping machine and after crimping to determine that the operation has been properly accomplished; steps on foot pedal to close jaws of machine and force the clamping of the clip. Worker sets own speed but he must work extremely rapidly in order to accomplish the required daily production.
5. Details of Working Conditions: Works inside in a clean, comfortable, adequately ventilated and lighted room, noisy because of adjacent machinery. Other workers are at adjoining tables, but no coordination of effort is required. The only mechanical hazard is getting fingers in jaws of crimping machine.
6. Hazards: May pinch fingers in jaws of crimping machine if hand and foot coordination is poor.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Obtains edge wire frame from stack at left end of table (supplied by floor worker) and places it in the center of the table just back of the clamping machine.
 - b. From the left rear of the table (where it has been placed by floor worker) lifts coil unit, placing it in position inside the edge wire frame, judging the accuracy of the placement by feeling the edge wire as the unit is set down.
 - c. With the left hand, picks up the half formed clip, inserting it in the cavity in the front jaw of the clamping machine, being sure it is completely nested.
 - d. With the fingers of both hands grasps the edge wire and the part of the bottom coil next to it, pulls it forward, and inserts it in the clip in the jaws of the clamping machine and holds it in position with the coil just behind the frame wire. Care must be taken not to press downward or the clip will be tipped out of the cavity in the jaw.

MATTRESSES AND BED SPRINGS

CHAIR SPRING ASSEMBLER (Contd.)

- e. Steps on the foot pedal to close the jaws and wrap the clip tightly around both the edge wire and the coil loop. Care must be taken to use a steady, quick stroke on the foot pedal to insure the proper forming of the clip.
- f. Removes work from clamping machine and moves to the next coil, simultaneously inspecting the clip just placed in position by feeling of it as the hands move past it.
- g. Repeats the operation where each coil loop touches the edge wire frame, maintaining each coil in proper alignment.
- h. When completed the Unit is pushed to the right rear of the table for removal by floor worker.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Foot operated clamping machine mounted on the table at the front center; container for clips; pliers for removing defective clips; and flat top work table.
- b. Set-up and Maintenance: By plant mechanic.
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:
Substantially the same in all plants.

- 10. Usual Pre-employment Training: None -- blind worker should have sufficient pre-employment training to insure good orientation and manual skill.
- 11. Usual Training Procedure on the Job: Foreman, section supervisor, or an assigned experienced worker gives step by step instruction in the details of the job, watching the new worker's development to insure proper work habits.
- 12. Any Training Deviations Suggested for the Blind: Employment counselors should have previously become familiar with alternative procedures for the blind and be present and assist with the instruction.

MATTRESSES AND BED SPRINGS

CHAIR SPRING ASSEMBLER (Contd.)

13. Production:
- a. Full: 300 to 325 coils per hour according to type and number per unit.
 - b. Time to Reach Normal Efficiency: Four months.
14. Interrelation with Preceding and Succeeding Jobs: None
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
- a. Vision Required for the Job: None
 - b. Conditions affecting Suitability of a Particular Job:
 - 1. For the Totally Blind: Spring units and parts to be supplied and removed by floor worker.
 - 2. For the Partially Sighted: Light conditions and travel requirements for obtaining and disposing of material should be compatible with the type and amount of the worker's vision.
18. Avoid the Following Conditions: Requirement for complete visual inspection of the completed unit.
19. Other Jobs Often Combined for Full-Time Employment: Assembling spring units, operating coil-making machines, assembling helicals.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:
- Plants making bed springs, automobile cushions, and upholstered furniture.

MATTRESSES AND BED SPRINGS

LACING DOWN1. Name Used for Position in Plant Surveyed: Lacing DownD. O. T. Title: Mattress FinisherCode: 4-36.413Alternate Titles: Finisher hand; regulator and finisher
(mattress and bed springs)

D. O. T. Definition: Tufts and stitches felted mattresses by hand to hold the filling in shape to the cover and to finish the mattress; measures and marks off tufting places with rule and crayon on both sides of mattress; threads a tufting cord through the eye of each of the required number of tufting buttons or around cotton tufts to prepare them for use; sews through mattress and attaches button or tuft to cord; reference, Tufter I; hand stitches through side and end borders of mattress into filling so as to hold filling to borders; gathers edge of mattress by hand into a roll; sews roll in place with heavy thread around top and bottom edge of mattress so as to preserve its box shape, reference, Roll-Edge-Machine Operator. May operate a mattress-filling machine to fill covers. May work on either new or renovated mattresses.

2. Usual Operator:a. Sex: Maleb. General Characteristics: Tall, active, nimble, and of average mental ability.3. Physical Demands:a. Activities: Standing, reaching, feeling, fingering, lifting, walking.b. Working Conditions: Inside, dusty, adequate lighting, adequate ventilation, working around others.c. Skill Required: Good orientation within arm's reach; ability to locate positions and measure distances quickly and accurately by spanning.

MATTRESSES AND BED SPRINGS

LACING DOWN (Contd.)

4. Details of Physical Activities: Stands all day, reaches, feels and fingers cloth surface, fingers string to thread needles and tie knots. Lifts loads, weighing approximately 50 pounds, and walks with them a distance of eight or ten steps.
5. Details of Working Conditions: Works inside, around others, in an adequately lighted and ventilated room, which is dusty because of lint from the mattress filler.
6. Hazards: Occasionally cuts fingers with knife when clipping loops and frequently sticks fingers with needle when locating position of needle being thrust through the mattress. The breathing of lint irritates the nostrils and lungs of some people and may be lessened by the wearing of a respirator.
7. Sequence of Steps in Position in Plant Surveyed:
Worker:
 - a. With both hands picks up mattress and places it on sewing rack.
 - b. Threads needle, pulling end through the eye approximately eighteen inches; measures approximately two double arm lengths from eye of needle, and cuts with knife.
 - c. With the left hand spans with the thumb and little finger a distance of eight inches from the end, and the same distance from the side, and inserts needle. (This will locate the starting position in the left corner, eight inches from the side and end.)
 - d. With the right hand forces the needle downward while the left hand reaches beneath the sewing rack; locates the point of the needle, pulls it through, moves the point about one inch to the right, thrusts the needle upward through the mattress, locates the point coming through the top with the fingers of the right hand, pulls it through, taking up all the slack in the stitch and making the thickness of the mattress approximately three inches.
 - e. Repeats the operation over the length of the mattress.

MATTRESSES AND BED SPRINGS

LACING DOWN (Contd.)

- f. Without cutting the string and using the row just completed as a starting point, spans eight inches across the mattress and twelve inches in from the end. (This will locate the stitches of each succeeding row half way between the stitches in the preceding row.)
- g. Repeats the process until half the width of the mattress has been laced down.
- h. Moves to the opposite side and repeats process in identically the same manner until the entire surface has been laced. (Rows will be in line crosswise and lengthwise, each forming diamonds.)
- i. Starting either at the corner where the lacing was finished or at the corner where the work began, clips all the strings midway between stitching points with a knife.
- j. Using a mattress knot, ties all stitches, making certain that the required thickness has been uniformly maintained, and clips off any superfluous ends.
- k. Using tufting tool, presses each knot through one of the holes made by the needle, out of sight inside the mattress. (Tufting tool resembles an awl with a flat, bent end containing a groove which fits over the knot.)
- l. From a skein of tufting yarn held in the left hand, cuts off approximately one inch with a knife and tucks under loop of the stitch with the index finger of the right hand, making certain that one-half its length is on each side of the string.
- m. Upon completing the tufting of all the stitches on the top side of the mattress, turns it over and repeats the process of tufting all the stitches on the second side.
- n. Picks the mattress up, carries it six to eight steps and stacks.

NOTE: In some plants a tufting press may be used which is composed of two boards carrying hemispherical cups with a large hole in each. The mattress is set between the two parts of the press, which when

MATTRESSES AND BED SPRINGS

LACING DOWN (Contd.)

pulled together, depress the mattress at the points where the tying down is to be done. A loop of tape or string is then pushed through with a tufting needle or pulled through with a hook. Often the press is swung into a vertical position and two persons act as a team working on opposite sides.

Sometimes buttons are used instead of tufts, while other mattress makers use tape instead of string and then dispense with both buttons and tufts. A common arrangement is to have four rows of seven tufts with three intermediate rows of six tufts.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Lacing rack seven feet long, five feet wide, and approximately four feet high, with slatted top arranged to permit needle to be thrust through the mattress from the bottom: Mattress needle; tufting tool, and pocket knife.
 - b. Set-up and Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants: None
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Detailed steps explained by foreman or supervisor; additional coaching by experienced tufter or supervisor.
12. Any Training Deviations Suggested for the Blind: None
13. Production:
 - a. Full: Three to four per hour on 4-7 3-6 diamond pattern.
 - b. Time to Reach Normal Efficiency: Approximately two weeks.

MATTRESSES AND BED SPRINGS

LACING DOWN (Contd.)14. Interrelation with Preceding and Succeeding Jobs: Worker

None in plant surveyed. In some factories and in numerous renovating plants, the tufter must keep ahead of the beater and affects the rate of production of the roll edge stitcher, either hand or machine.

15. Teaming with Other Workers: None16. Modification, Deviation, Special Tools for the Blind: None17. Sight Requirements and Conditions:a. Vision Required for the Job: Noneb. Conditions Affecting Suitability of a Particular Job:

1. For the Totally Blind: No extensive travel through plant to secure and dispose of work.

2. For the Partially Sighted: Conditions must be compatible with the type, amount of vision, and eye condition of the worker.

18. Avoid the Following Conditions: Transfer to other jobs not approved as suitable for performance without the use of sight.19. Other Jobs Often Combined for Full-Time Employment: Tearing down; operating picker; beating out; roll edging by hand or machine.20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Mattress, spring and bedding factories; renovating shops; upholstery shops; and second hand stores.

MATTRESSES AND BED SPRINGS

MATTRESS BUILDER1. Name Used for Position in Plant Surveyed: Mattress BuilderD. O. T. Title: Mattress Filling Machine OperatorCode: 6-36.421Alternate Titles: Filler box operator; filler machine operator; filler operator; mattress filler.

D. O. T. Definition: Operates a machine to insert filling into mattress covers; weighs out specified amount of cotton felt or padding; spreads half of padding evenly on bottom of compression box; lays pad of sisal or burlap on felt; places innerspring assembly on pad; spreads another pad over top of springs; spreads remaining half of cotton felt on top of pad; tacks felt down at sides and end of springs; operates lever to bring compression-box cover down on assembled materials and compresses them to desired thickness; operates another lever to compress sides of assembly; slips open end of mattress cover over filler opening; operates lever to cause machine to push compressed assembly into cover, holding and stretching cover with hands; stops machine when cover is full and pulls cover from filler. May build up filling of layers of felt only, without spring assembly or on layers of felt and a low-grade filler. May be supplied with innersprings which have previously been covered with padding. May operate a sewing machine to close filled mattresses.

Items Worked on in Plant Surveyed: Innerspring mattresses.2. Usual Operator:a. Sex: Maleb. General Characteristics: Worker should have average speed and dexterity, be of average height or taller, and have medium strength and mental ability.3. Physical Demands:a. Activities: Walking, standing, turning, stooping, reaching, lifting, carrying, pushing, pulling, handling, fingering, feeling, talking, hearing, and color vision.

MATTRESSES AND BED SPRINGS

MATTRESS BUILDER (Contd.)

- b. Working Conditions: Inside, dusty, noisy, adequate lighting and ventilation, mechanical hazards, moving objects cramped quarters, working with others, working around others.
- c. Skill Required: Semi-skilled. Ability to handle quickly and accurately soft materials, such as cotton batting, sisal padding; ability to judge overlap and determine evenness of spread by feeling; ability with hand tools sometimes required. If blind, must have good orientation in gross movements, with ability to move accurately and quickly from work table to machine or to piles of material within distances up to ten feet; ability to visualize and follow action of working partner through motion and forces applied to parts being handled jointly, and thus coordinate mutual action.
- 4. Details of Physical Activities: Stands and walks all day around work table, the size of the mattress, to filler machine, and to various piles of materials within radius of 15 feet; to secure supplies or progress the units being worked upon. Turns and sometimes stoops to pick up materials and spring units from stacks on the floor; reaches distances up to 3 feet to spread and stretch cotton batting and other padding material. Lifts bulky innerspring units or partially finished mattresses to move them from one work position to another or dispose of them onto the finished stack; pushes and pulls lightly to adjust unit to proper position on work table, or to stretch padding material. Will have to push heavily to gather tick onto spout of filler machine and to keep tick well stretched while filler is being inserted. Handles and fingers folded units of sisal, cotton padding and mattress ticks, to open them up and spread them out uniformly on work table or over spring units to adjust overlap and tuck it into proper position, and to determine location for placing the staples. When blind worker is teaming with sighted worker, must talk and hear to coordinate activities. One member of the team must have sufficient color perception to select proper tick according to orders being filled, and see sufficiently to set width of the machine according to mark painted on it.

MATTRESSES AND BED SPRINGS

MATTRESS BUILDER (Contd.)

5. Details of Working Conditions: Works inside in a well-lighted and well-ventilated room which is clean, but may be dusty from cotton lint. Slight mechanical hazard from moving parts of the filler box. When operating filler machine, always teams with another worker, and on other operations may not work with a partner. Works around others who are at adjacent work positions. Some noise from edging and other sewing machines. Quarters may be cramped with stacks of mattresses, parts, and materials. Moving objects in work area are usually limited to mattresses being carried by other workers.
6. Hazards: Gears and belts on filler machine are well covered. The only hazards are from touching the moving feed chains which are well guarded by their own supports that may be used as guides by blind persons in determining position or action of the machine. Sufficient noise is made by the machine so that blind worker may always know when it is in motion.
7. Sequence of Steps in Position in Plant Surveyed:
- Worker:
- a. Applying Sisal Pad to Innerspring Units:
1. Obtains innerspring unit from stack placed near work table by floor worker and places it on work table.
 2. Trims any protruding ends of tying wire.
 3. Obtains folded sisal padding from stack placed nearby by floor worker, lays it on spring unit, unfolds and adjusts it evenly over the unit.
 4. Starting at one corner adjusts padding to approximately two inches overlap, tucks this around and under edge of frame, and staples in position in four or five places. Repeats at other corner at the same end. Adjusts edge of padding across the end, tucks in and staples at distances of six to eight inches.
 5. Repeats operation at opposite end of spring unit, stretching sisal enough to give proper overlap. Adjusts and tucks in overlap along the sides and staples at regular intervals.

MATTRESSES AND BED SPRINGS

MATTRESS BUILDER (Contd.)

6. Turns spring unit over, applies another pad in the same method as used for the first.
 7. Removes spring unit from table, depositing it on supply table or stacking it on the floor.
- b. Building Padding on Innerspring Units:
- (This step may be performed by a single worker or two workers together according to circumstances.)
1. Obtains sisal covered spring unit from constant height supply table or stack on the floor, and places it on the work table.
 2. From supply brought in by floor worker, obtains roll of Crown felt, lays it in the middle of the spring unit, unrolls and adjusts it into position, with its ends even with the edge of the unit.
 3. From supply furnished by floor worker, obtains folded pad of cotton felting, lays it on end of spring unit, unfolds and unrolls it to cover entire unit, adjusts its position to give approximately 3 inches overlap and tucks this under the edge and in between the top and second loops of the coil.
 4. Repeats with additional layers of padding material according to specifications for particular mattresses being built. (Additional padding may include layers of plain or rubberized sisal for special types of mattresses.)
 5. Turns the spring unit over and applies covering to the second side in the same way that it was applied to the first side.
 6. Lifts padded spring unit onto supply table or direct into box of filler machine.

MATTRESSES AND BED SPRINGS

MATTRESS BUILDER (Contd.)

c. Operating Filling Machine to Insert Filler into the Tick:

(This operation requires the teaming of two workers.)

1. Workers, on opposite sides of filler box, lift unit and set it into position. Care must be exercised to be sure that cotton felt is not torn on edge of box.
2. Worker, on control side of machine, steps on foot pedal, causing filler to be fed into spout of the machine, stopping when the leading edge has progressed to within one inch of the end of the spout.
3. Each worker applies a piece of cotton batting to his corner of the filler, tucking it in between the outer and second loops of the coil.
4. From supply furnished by floor worker, obtains folded tick covering, spreads it on receiving table, and feeds it onto spout of filler machine, pushing it tightly onto the outlet, being sure that the seams and corners come even with the corners of the spout. The two workers must bring their respective sides up in unison.
5. While both workers push against the motion of the tick, worker on the control side steps on the foot pedal, causing the chains to move the filler unit through the spout and into the tick, until the entire unit has been expelled. Mattress is then pushed the rest of the way onto the feed table and the end walls brought up over the end of the filler.
6. The folded mattress is then lifted onto supply table for closing machine or stack on the floor.

NOTE: In some plants an older model of filling machine will be used, in which case the operation will be similar to that shown in the D. O. T. Description in Item 1.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Work tables proper height for each operation; constant height supply tables; table model hand stapler proper height to straddle upper edge of spring unit. J. W. Droll Company mattress filling machine adjustable for width and having 18 feed chains on the

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

MATTRESSES AND BED SPRINGS

MATTRESS BUILDER (Contd.)

top and 18 on the bottom for moving padded unit through the spout into the tick. Filler machine is powered with electric motor with foot pedal control for feeding mattresses into tick, and hand lever control for adjusting width of box. All gears and driving mechanisms are completely enclosed.

- b. Set-up and Maintenance: Setting of the width of the filler box for a particular size mattress is done by the filler box operator pushing and pulling a lever until the indicator on the front edge of the box comes to the proper graduation for the type of mattresses being worked on. Maintenance and repair of the equipment is the responsibility of the plant mechanic.
- c. Modification: None. (Sighted member of the filler box team reads graduations when machine is being adjusted for width.)

9. Equipment Variations Which May be Found in Other Plants:

An older type filler box has metal lids which are clamped down over the padded unit and a power-driven plunger comes in from the back and pushes the entire unit forward through the spout into the tick. In plants where power-driven filler boxes are not available, a filler table may be equipped with metal pans which can be varied in width and compressed by means of a bar and clamps. After the padded spring unit has been compressed in the pans, the tick is pulled over the assembly and the pans are slid out one piece at a time.

10. Usual Pre-employment Training: None11. Usual Training Procedure on the Job: Primary instruction is given by shop foreman and additional coaching may be furnished by experienced fellow worker where two are working together on the same unit. Otherwise, foreman continues coaching and checking as required.12. Any Training Deviations Suggested for the Blind: None on the job. Blind worker's adjustment, including travel, orientation and general work tolerance should be well developed in his pre-employment training processes.

MATTRESSES AND BED SPRINGS

MATTRESS BUILDER (Contd.)

13. Production:
- a. Full: Applying sisal covering, six units per hour, working alone. Applying padding, two workers could produce 120 to 150 units per day. Operating filler box, two workers will do 120 to 150 per day.
 - b. Time to Reach Normal Efficiency: Two to three weeks.
14. Interrelation with Preceding and Succeeding Jobs: Where different workers perform each step, the production must be steady to maintain the over-all line production; allowable fluctuation will vary according to the space available for storage of reserve supplies between each step in the process. The care with which each operation is performed affects the facility with which succeeding steps can be accomplished, as well as the general quality of the product.
15. Teaming with Other Workers: In inserting the padded units into the tick, whether by hand or power equipment, it is necessary that two persons work together. The padding of the spring with sisal or cotton felt may be accomplished by a single worker, although when two persons work together a considerable amount of walking around the large work table is eliminated. When a person is working alone on the padding, he usually secures help from the adjacent worker for removing the completed unit from the work table to the storage stack.
16. Modification, Deviation, Special Tools for the Blind: When a blind person teams with another worker, the division of duties can be equitably adjusted so that steps, such as the setting of the width of the filler box or the selection of the right color of tick is accomplished by the sighted worker. The blind worker's travel is often automatically guided as the two workers handle a unit together.
17. Sight Requirements and Conditions:
- a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 - 1. For the Totally Blind: Travel for the securing of supplies or disposition of the product should be limited to the immediate work area and through traffic

MATTRESSES AND BED SPRINGS

MATTRESS BUILDER (Contd.)

and trucks should by-pass the immediate work area. The system for furnishing directions and specifications should be such that they can be imparted by voice to the blind worker, or a partner should be responsible for reading and obtaining them from the written work sheet.

2. For the Partially Sighted: Travel and dust conditions must be compatible with the worker's type and amount of vision and eye condition.
18. Avoid the Following Conditions: Avoid frequent changes of specifications and short-run lots for which information must be secured from written work sheets; long travel for the obtaining and disposal of products; the necessity of filling in time on jobs not suitable.
19. Other Jobs Often Combined for Full-Time Employment: The three main steps as shown above may be accomplished by one pair of workers; also these workers may be required to do closing or operating of roll edge machine or tufting. Some workers may do the covering and/or building of box springs.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

This type of job is found in any plant making new mattresses and in some renovating shops.

MATTRESSES AND BED SPRINGS

BOX SPRING TIER

1. Name Used for Position in Plant Surveyed: Box Spring Tier

D. O. T. Title: Box Spring Maker

Code: 4-36,411

Alternate Titles: Box spring assembler, spring man

D. O. T. Definition: Attaches, ties together, and pads coil springs into wooden foundations to form box springs for wooden or metal beds; lays wooden frame on work table; attaches required number of coil springs to wooden cross slats with nails or staples, using a hand hammer; tacks pieces of heavy twine to sides of frame; laces and interweaves twine to tops of springs to secure them in place; spreads cover of burlap or canvas over top of springs and tacks it securely to frame, or sews it to tops of springs; spreads layer of padding material over spring cover; covers padding with ticking or other material and tacks it to frame; tacks light fabric over bottom of frame to cover opening; nails canvas handles to sides of frame.

Items Worked on in Plant Surveyed: Box Springs

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Quick, agile, nimble fingers; at least average height, average or better mental ability, with good physical endurance.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, carrying, pushing, pulling, handling, fingering, feeling.

b. Working Conditions: Inside, dusty, noisy, adequate lighting and ventilation; moving objects; cramped quarters; works with others and around others.

c. Skill Required: Skilled; must have ability to accurately judge spacing, line up and height of coils; skilled

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

MATTRESSES AND BED SPRINGS

BOX SPRING TIER (Contd.)

with hand tools including hammer and stapling machine, and at tying and tightening heavy cords; good orientation and ability to travel well within 10 feet radius of work area.

4. Details of Physical Activities: Stands all day at work table and walks around within a radius of ten feet to obtain supplies and/or deposit finished articles; turns and sometimes stoops to pick up parts or supplies; reaches across work table a distance of approximately three feet to place and fasten coils into position. Lifts one side of partially finished spring unit to turn it over, and in cooperation with another worker, lifts and carries unit a distance up to ten feet to place it on stack, or may alone lift and pull finished spring onto stack close to the work table. Handles, fingers, and feels coils and cords to place springs in position, fastening them down and tying them together; handles, feels, fingers and pulls covering material, cotton felt, and outside tick to place them in position. When teaming with another worker, talks and listens to keep work coordinated.
5. Details of Working Conditions: Works inside in a comfortable, well-lighted, well-ventilated room, sometimes dusty from cotton lint, and sometimes noisy from operation of adjacent machinery. Trucks may be operating nearby to remove finished products or other workers may be carrying finished springs to storage stacks. At times work area may be crowded with the stacks of parts and finished items. Usually works around others and frequently teams with another worker on the same unit.
6. Hazards: The only hazards are those of cutting fingers on sharp end of coil wire, or bruising and lacerating the fingers when driving nails or tacks. If worker will exercise care and learn the proper handling of tools and nails, maintain work in a proper, firm position on the table, most of these dangers will be eliminated.
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

 - a. Lifts wooden base frame from stack, which has been brought up by floor worker, and places it on the table.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

MATTRESSES AND BED SPRINGS

BOX SPRING TIER (Contd.)

- b. From box under table secures strips of scrap ticking, places them on the wooden cross slats, and tacks them in position.
- c. At the center line for each roll of coils, drives a nail into the edge of the frame; leaves enough protruding so that a string can be tied to it; the position of the center lines across the head and foot of the spring are determined by the use of a marked gauge stick, while those along the sides are determined from the slats already nailed in position. Ties a long piece of cord to each of the nails at one end, stretching the strings across the frame and fastening each to a corresponding nail at the second end. (There will be 6, 7, or 8 rows of coils according to the width of the unit and each row will be 9 coils long.)
- d. From the supply brought up by floor worker, obtains a nest of coils, separating and distributing them along the table.
- e. Taking one coil at a time, places it with the knotted end up so that it is uniformly centered with respect to the cord and slat, and fastens the bottom loop to the slat, using two staples placed at opposite sides. (With one hand guides bottom end of stapling device to straddle the wire, using the other hand to lift up the handle and bring the plunger down with a quick, forceful stroke.) Starts operation on the center or near center row of coils, then completes successive rows to the edge. Uses No. 2 (higher) coils for the edge rows while No. 1's are used for the remainder. When stapling is completed, cords are untied at the second end of the frame and pulled through to the first end, after which they are used in the tying down process.
- f. According to a definite, predetermined pattern, uses heavy cord to tie the coils down to a definite height and to hold them in vertical position with the top loops uniformly spaced. Fastens the end of cords to the nails already inserted in the edge of frame, and by judgment and the use of a gauge stick, determines that the height of each coil above the frame is properly adjusted. Cords are run lengthwise and crosswise along the rows of coils and in both diagonal directions. The cord is knotted to the top loop of each

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

MATTRESSES AND BED SPRINGS

BOX SPRING TIER (Contd.)

coil where they intersect. (If a knot is tied wherever a wire is crossed, it results in 8 knots per top loop and is known as an 8-way tie.) Staying cords may be run from the nail to the center loop of the outside coil and thence to the top of the second or third coil. There are several patterns of tying and types of knots used, each having its own advantage in speed or quality of product.

- g. Places the edge wire frame in position around the unit and fastens it to the top loop of each of the outer coils, using a plier-like tool to crimp the metal clips in position to accomplish the fastening.
- h. Spreads a sheet of sisal cloth over the top of the unit, folds the edge around the edge wire and sews it into position, using a large needle and heavy thread. (In some plants the sisal may be stapled in position instead of being sewed.)
- i. Places layers of felted cotton over the top of the unit, adjusting its position so that it drapes evenly over all the edges.
- j. Spreads a prepared tick over the unit and pulls the edges down evenly, tacking them to the side of the frame.
- k. Turns unit over on the table, spreads and tacks sheet of muslin over the bottom to complete enclosure.
- l. Moves completed unit over to stack on the floor for removal by floor worker.

NOTE: In some cases the sighted worker may use a straight edge and chalk to mark where the coils are to be placed on each slat. A gauge board may be equipped with loops to hook over a pair of center line nails, thus holding it in such a position that when the groove in the stapling device is placed over the edge of the bottom coil and slid against the gauge board, the coil will be in the proper position. In most plants one worker or a team of workers will do all the steps as listed below. However, occasionally one worker will fasten the coils to the frame, others do the tying and edging, while still another worker applies the sisal padding and tick. Occasionally, the worker may be required to make the wooden frame as well.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

MATTRESSES AND BED SPRINGS

BOX SPRING TIER (Contd.)

8. Equipment as Found in the Particular Plant Surveyed:

a. Identification: Work table slightly larger than the frame; hammer; knife for cutting string; crimping pliers; stapling machine which feeds staples automatically; large sewing needle.

b. Set-up and Maintenance: None required.

c. Modification: No special modification for the blind.

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants.

10. Usual Pre-employment Training: None required.

11. Usual Training Procedure on the Job: The new worker is usually given primary instruction by the foreman who follows up and guides him, or this may be done by an experienced worker teaming with the new one.

12. Any Training Deviations Suggested for the Blind: Blind worker's skill at hand tools and judgment of distance and position should be developed to a high degree of efficiency before coming on the job. While the blind person is developing on the job, the employment counselor should make certain that he is forming proper work habits and alternative methods of observation, such as judging distance to space the coils, and checking the depth of the gage stick.

13. Production:

a. Full: If worker does all steps including the completing of the frame, he should make two units per day; the setting and stapling of coils should take 15 to 20 minutes; the lacing and tying operation takes two to three hours, depending on the number of rows of coils, type and number of knots used. Padding and covering takes 30 minutes.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

MATTRESSES AND BED SPRINGS

BOX SPRING TIER (Contd.)

- b. Time to Reach Normal Efficiency: Pattern and system should be learned in 30 days. To develop full speed will require 3 to 6 months according to quality of workmanship required.
14. Interrelation with Preceding and Succeeding Jobs: None
15. Teaming with Other Workers: Two workers may team up while working on the same unit, in which case coordination will be required. In other instances, workers will assist each other only with the lifting of the finished unit from the table to the stack.
16. Modification, Deviation, Special Tools for the Blind: For the blind the gage will be notched or marked with round-headed tacks to indicate the center line positions for the coil. A depth gage is made by notching a wooden stick at a point equal to the height of the finished coil.
17. Sight Requirements and Conditions:
- a. Vision Required for the Job: None
- b. Conditions Affecting Suitability of a Particular Job:
1. For the Totally Blind: No travel required outside the immediate work area.
2. For the Partially Sighted: Light conditions, travel requirements, degree of lifting and susceptibility to dust should be compatible with the type, amount of vision and eye condition of the worker.
18. Avoid the Following Conditions: Necessity for making the wooden base frames without suitable jigs.
19. Other Jobs Often Combined for Full-Time Employment: Jobs such as tying cushion units, tufting, roll-edging, filling mattresses, springing Davenos and Day Beds.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:
- Any factories making mattresses and bed springs and the small shops doing renovating.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D. C.

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Supplement 5

May 15, 1949

REHABILITATION SERVICE SERIES NUMBER 58 - SUPPLEMENT 5

TO: Divisions of Vocational Rehabilitation (in States with no separate agency for the blind); Commissions and Other Agencies for the Blind

SUBJECT: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category SI-6, Foundries

The attached material on the foundry industry is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as the fifth category in Part I, Specific Industry Series. It describes a few of the jobs in this industry and is not intended to be all inclusive of all possibilities for blind workers. Like the jobs described in the first issue, those in this category have been observed and tested by a blind member of the staff of the Division of Services to the Blind.

Other categories of job specifications are being prepared and will be forwarded to you at an early date. Additional copies of the Handbook or any of its supplements will be furnished upon request. We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

D. H. Dabelstein
D. H. Dabelstein
Assistant Director

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRY SERIES
Category SI-6

FOUNDRIES

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The above list only partially represents the employment opportunities for blind persons in this category and specifications for others will be issued as circumstances permit.

Additional jobs such as the following should be sought and all jobs must be carefully analyzed for suitability under the conditions found in a particular plant:

Operating a Core Blower Machine

Operating a Turn Over Draw Machine

Shaping out Castings

Various Types of Laboring Jobs

HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRY SERIES

FOUNDRIES

General Information Sheet

Character of the Industry: Foundries comprise that branch of the metal working industry which produces castings--that is, metal objects shaped by pouring molten metal into molds and allowing the metal to solidify. This process is highly diversified. It serves as an economical means of forming a wide range of intricate shapes possessing considerable strength and rigidity and varying in size from several ounces to many tons. Castings are therefore used extensively as the component parts of a large variety of metal products. Although some finished articles are cast, the bulk of the castings output flows into the metal fabricating industry to serve as integral parts of the final product. Illustrations of the many applications of castings are automotive cylinder blocks, farm machinery gears, bearings, valve bodies, machine tool beds, ingot molds, water mains, bath tubs, radiators, washing machine parts, kitchen utensil and radio parts.

Castings are applicable to a number of basic metals and their alloys. They are classified into four broad groups--cast iron, steel, malleable iron, and the non-ferrous alloys. Cast iron is a technical term embracing gray, white, mottled and chilled iron, among which gray iron is quantitatively the most important. Cast steel includes carbon and alloy steel, which is further classified according to its carbon and alloy content. Malleable iron is an originally brittle "white iron" converted by a heat treating cycle into the malleable product. The non-ferrous alloys are subdivided according to their dominant elements--copper, aluminum, magnesium, lead, zinc, tin and nickel.

The tendency toward specialization and the use of production methods for casting one or two metals give rise to several fairly distinctive classes of foundries. The kinds of metals used in a single establishment depend largely on the type of melting equipment and the training and experience of the workers in the plant. However, foundries often operate separate departments in order to cast two or more types of metals; thus many ferrous foundries have non-ferrous departments. In any consideration of foundries the distinction between jobbing and production methods of casting is fundamental. In production-type operations large numbers of castings are made from each design,

FOUNDRIES

General Information Sheet (Contd.)

and machine methods are employed to a substantial extent. In jobbing operations very limited numbers of castings, frequently only one or two, are made of each design and hand methods predominate. Intermediate between the two is the semi-production type of operation. Production foundries typically serve mass production industries which use large quantities of identical castings as components of standardized final products such as automobiles, plumbing and heating equipment, and household appliances. Jobbing foundries provide castings for incorporation into limited quantity products such as machine tools and special purpose machinery of various types. In practice, the distinction between production and jobbing foundries is partially blurred by the fact that production foundries often do some jobbing work, especially in slack seasons.

Foundry operations may be carried on either as separate enterprises or as part of broader manufacturing projects. Independent or commercial foundries specialize in castings, selling their output to other plants for incorporation in their product. Captive or integrated foundries are departments or subsidiaries of a parent company to which they transfer their output of castings for final assembly.

The production of gray iron castings is greater than the combined total of all other types. Next in order in total weight of castings produced are steel, malleable iron and non-ferrous metal castings. Among the ferrous metal foundries, gray iron foundries are typically small production units, the majority employing less than 50 factory workers and only a very few employing more than 250 such workers. Both steel and malleable iron foundries are somewhat larger than the typical gray iron foundry, more than half employing over 250 wage earners, with a few employing as many as 4,000, and practically none having a payroll of less than 50. Non-ferrous metal foundries are usually quite small, the majority employing less than 25 workers and practically none with a production force of more than 200.

Distribution of the Industry: Because foundries produce parts for other metal working industries they are located in every section of the country where metal working activity is significant. The concentration is in the principal industrial areas of the country - California, Ohio, Illinois, and Pennsylvania.

FOUNDRIES

General Information Sheet (Contd.)

Type of Workers Usually Employed: Of the estimated 425,000 (Source: "Employment Outlook in Foundry Occupations," Bulletin No. 880, United States Department of Labor, Bureau of Labor Statistics) production workers employed in foundries in 1944, over 1/4 might be classed as skilled. Most of these skilled jobs, as well as many of the less skilled ones, are peculiar to foundry processes, molding and core making in particular. The foundry occupations are mainly limited to the employment of men, reflecting the strenuous nature of much of the work as well as traditional practices. A very small percentage, probably one or two percent, of the workers are women who are primarily employed as small core makers in production foundries. The proportion of Negro employees is markedly high. They are not only employed in unskilled and semi-skilled jobs but also to a substantial extent as skilled molders and core makers. Wages in this industry compare favorably with those in the basic metal working industries generally.

Pattern making, molding and core making are considered to be highly skilled jobs and require an average of approximately four years apprenticeship or equivalent training. An apprentice or helper may perform many of the duties of a journeyman and it is with this in mind that the job description of core making is included in this category as a suggested employment opportunity for a blind person. Jobs in the finishing department do not usually require status, although they may be considered as a part of a journeyman's training. Since union contracts are the rule in foundries, it will be necessary for the employment counselor to establish a working relationship with these unions if he hopes to secure favorable consideration of a blind person for a job in this industry.

Working Conditions: The working environment varies greatly among individual foundries. Some compare favorably with metal working operations as a whole in such respects as frequency and severity of accidents, incidence of industrial diseases, plant cleanliness, ventilation and temperature. Others fall far below average for safety and comfort. Because of this wide range, generalization on foundry working conditions is likely to be somewhat misleading. However, with this limitation in view, the following information may be helpful: Smoke and fumes are often a nuisance in foundries; however, where adequate ventilation systems have been installed, discomfort from these sources has been minimized. Heat may be excessive near the melting units, especially in summer, and inadequate in other operations of the establishment during the winter. However, better regulation of temperature has been achieved through the installation of air-conditioning equipment. Noise may be a problem especially in the

FOUNDRIES

General Information Sheet (Contd.)

furnace cleaning and finishing rooms. Personal cleanliness in foundry work is difficult because of the extensive use of sand in the casting process. However, good housekeeping has in many cases kept this situation under control. In addition, a large number of foundries now provide showers for their employees.

Safety Precautions, Health Conditions, Hazards: Hand movement of heavy material is a major source of foundry accidents resulting in strains or crushed fingers or toes. Objects dropped from overhead cranes are responsible for some of the more serious accidents; spilled or splashed molten metals may endanger many workers on the foundry floor. Since much of the work is done on the floor, falls may result from tripping over tools, scrap metal and other objects left lying about. In general pattern shops and core rooms, where the work is principally done on benches, are the least hazardous departments. Molding departments are somewhat more hazardous, and shake-out, mold-cleaning, and finishing operations show the highest injury rates. Hazards associated with foundry work are to a large degree preventable by such means as good housekeeping (the orderly arrangement of materials and tools), providing special safety equipment for certain operations, furnishing machinery for heavy lifting, and training the workers in safe practices. Foundry workers may be exposed to the danger of silicosis which, in some cases, may lead to tuberculosis and pneumonia. However, the incidence of silicosis is actually quite low, and it is a relatively minor source of disability. The danger of silicosis may, to a large extent, be eliminated by the installation of dust control equipment. In recent years substantial progress has been made in this respect.

General Coverage Jobs Pertinent: Many jobbing foundries pack their castings in wooden boxes or crates for shipment. This operation will be described under Wrapping and Packaging GC-2.

Combination Employment:

- A. Core maker, core cleaner, core maker machine.
- B. Rough grinder, deburrer.

Jobs Usually to be Avoided Although Seemingly Suitable: Chipper, sand conditioner, sand cutter, shake-out man.

FOUNDRIES

BENCH COREMAKER

1. Name Used for Position in Plant Surveyed: Bench Core Maker.

D.O.T. Title: Core maker (bench)

Code: 4-82.010

Alternate Titles: None

D.O.T. Definition: A core maker (1) who makes small and large size cores, used in molds to form hollows or holes in metal castings, on a work bench.

Items Worked on in Plant Surveyed: Small cores used in molds for casting the flange end of soil pipe.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, nimble, careful, average mental ability, Negro workers often employed.

3. Physical Demands:

a. Activities: Walking, standing, turning, reaching, lifting, carrying, handling, fingering, feeling, talking, hearing.

b. Working Conditions: Inside, dusty, dirty, odors, noisy, adequate lighting and ventilation, works around others.

c. Skill Required: Skilled. Ability to judge texture and contour tactually, to exercise a high degree of muscle control especially of the hands and arms, and to locate small objects within arm's reach quickly and accurately.

4. Details of Physical Activities: Stands all day; may walk a distance of from ten to twenty feet to place cores in oven; reaches toward back of bench to secure core sand. Lifts core plate weighing up to five pounds; turns to place it on storage shelf at right. Handles, fingers and feels sand, core box, mallet and scraper to make the core. Talks with and listens to others to exchange necessary information.

FOUNDRIES

BENCH COREMAKER (Contd.)

5. Details of Working Conditions: Works with others, inside, in adequately lighted and ventilated room. Air may contain an excessive amount of dust because of screening, mixing, and packing sand. Work is dirty because of the handling of core sand; noisy, due to the operation of nearby machinery and oven.
6. Hazards: There are no particular hazards connected with this position, unless the worker is required to place his cores in the oven. In this event, he must exercise extreme care in order to prevent minor burns which may result from touching the shelves inside the oven on which the cores are placed.

7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Secures a core drying plate from box at left (plates are supplied by another worker) and slides it onto the bench in front of him.
- b. Slides a core box onto the drying plate thus cleaning any excess sand from the plate.
- c. Cleans the inside of the core box by wiping it with a kerosene-saturated cloth.
- d. Sprinkles talcum into core to prevent the damp core sand from sticking to it.
- e. Using both hands, partially fills the core box with core sand which has been placed on the far side of the work table by another worker.
- f. Using a hand rammer, packs sand tightly into core box. (The experience and judgment of the worker is required to tell when the sand is packed tightly enough. If the sand is packed too tightly, it will prevent the escape of gases in the metal during cooling and cause blow holes in the casting. If the sand is packed too loosely, the result will be that the casting's surfaces will be pitted with sand particles.)
- g. Completely fills the remainder of the core box with sand and tamps it down tightly with a hand rammer. (Here, again, judgment must be used to determine when the sand is packed tightly enough.)

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

FOUNDRIES

BENCH COREMAKER (Contd.)

- h. Smooths the top of the core and removes surplus sand with a straight edge.
- i. Using a straight wire, pierces the core several times to permit the escape of gases when the casting is poured. (The number of vent holes is determined by the size of the core.) Taps the core box gently with a hammer to loosen it from the core.
- j. Using both hands, "parts" the core box (making certain that both hands are pulled straight away from the core).
- k. Places the core plate and core on a rack at his right for removal to the oven by another worker, where it is baked and hardened.

NOTE: In some plants this worker is required to carry his cores to the oven, in which case the employment counselor will have to consider the distance to be travelled and the type of oven used before determining the type and amount of vision the worker should possess. Although it is not recommended, totally blind persons have been known to load their cores into the oven.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Work bench; core box; hammer; hand rammer; straight edge, used as a scraper; vent wire and storage shelves.
- b. Set-up and Maintenance: None
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants. In production factories the cores may be removed by a conveyor belt.

- 10. Usual Pre-employment Training: Workers are frequently chosen from the foundry's labor force which has had some experience in handling sand and finished cores. In addition, credit for training received at a vocational school is sometimes given.
- 11. Usual Training Procedure on the Job: Basic instruction is generally given by an experienced coremaker who reduces the amount of his supervision as the new employee becomes more familiar with the tasks involved.

FOUNDRIES

BENCH COREMAKER (Contd.)

12. Any Training Deviations Suggested for the Blind: None
13. Production:
- a. Full: Not established because of the variation in the size of the cores and the intricacy of their contours. In the plant surveyed, the worker produced 25 of the above described cores per hour.
 - b. Time to Reach Normal Efficiency: One to three months.
14. Interrelation with Preceding and Succeeding Jobs: None
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: When placing a blind person on this job, the employment counselor will probably have to make arrangements with the company and the union for that person to be hired as an apprentice or a core-maker helper. In any event, there should be a complete understanding between all parties concerned.
17. Sight Requirements and Conditions:
- a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 - 1. For the Totally Blind: No inspection of finished cores and no requirements of the worker to place cores in oven.
 - 2. For the Partially Sighted: Travel and inspection requirements as well as heat and dust conditions must be compatible with the worker's type and amount of vision.
18. Avoid the Following Conditions: Transfer to other jobs which have not been approved as suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full-time Employment: Core cleaner, core machine operator.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:
- Production and semi-production types of foundries which cast ferrous and non-ferrous metals.

FOUNDRIES

CORE CLEANER

1. Name Used for Position in Plant Surveyed: Core Cleaner

D.O.T. Title: Core Cleaner

Code: 8.82.10

Alternate Titles: Core filer, core scraper

D.O.T. Definition: Core Cleaner II (foundry) Core filer; core scraper. Grinds or files high spots, feather edges, or fins from baked cores; uses hand and power tools, such as files, scrapers, abrasive stones, and grinding wheels. A task performed by a Coremaker Helper.

Items Worked on in Plant Surveyed: Small baked cores.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size; nimble, quick arm and hand movements; average mental ability; Negro workers frequently employed.

3. Physical Demands:

a. Activities: Standing, reaching, lifting, handling, fingering, feeling.

b. Working Conditions: Inside; adequate lighting and ventilation; works around others.

c. Skill Required: Ability to differentiate between smooth and rough surfaces tactually; sufficient muscular control to manipulate file and emery paper to remove excess material without injuring adjacent surfaces, and to locate items within arm's reach quickly and accurately.

4. Details of Physical Activities: Stands all day and works rapidly with hands and arms; reaches three or four feet ahead and to right or left; lifts tray of cores weighing up to fifteen pounds; handles, fingers and feels cores to detect fins, high spots and rough surfaces.

5. Details of Working Conditions: Works around others, inside, in adequately lighted and ventilated room.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

FOUNDRIES

CORE CLEANER (Contd.)

6. Hazards: None

7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Lifts a tray of cores brought to him by another worker from the far side of his bench and places it in a convenient position in front of him.
- b. Takes the baked cores from the tray, one by one, and, using a file, emery stone and/or sandpaper, removes fins and high spots, smooths rough surfaces and returns the core to its place on the tray.
- c. When all the cores have been completed, lifts tray and sets it on far left side of work bench for removal by another worker.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: File, emery stone, sandpaper and work bench.
- b. Set-up and Maintenance: None
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants except that conveyor belts may be used to remove trays of cleaned cores.

10. Usual Training Procedure on the Job: Supervisor instructs new worker in all steps of the operation.

11. Usual Pre-employment Training: Workers are frequently chosen from the foundry's labor force which has had some experience in handling sand and finished cores. In addition training received at a vocational school is helpful.

12. Any Training Deviations for the Blind: None

FOUNDRIES

CORE CLEANER (Contd.)13. Production:

- a. Full: Not established because of the wide variety of sizes and the difference in the intricacy of the cores.
- b. Time to Reach Normal Efficiency: Two weeks to two months depending upon the intricacy of the design of the cores.

14. Interrelation with Preceding and Succeeding Jobs: None15. Teaming with Other Workers: None16. Modification, Deviation, Special Tools for the Blind: None17. Sight Requirements and Conditions:

- a. Vision Required for the Job: None
- b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel outside the work area to secure or dispose of materials and no inspection or repair requirements.
 2. For the Partially Sighted: Travel and inspection requirements must be compatible with the type and amount of the worker's vision.

18. Avoid the Following Conditions: Transfer to other jobs which have not been approved as suitable for performance without the use of sight.19. Other Jobs Often Combined for Full-time Employment: Small coremaker; core machine operator.20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

Production foundries, or jobbing foundries of a production or semi-production nature.

FOUNDRIES

ROUGH GRINDER1. Name Used for Position in Plant Surveyed: Rough GrinderD.O.T. Title: Bench Grinder (any industry)Code: 6-77.710

Alternate titles: Emery wheel worker; finish grinder;
grinding-lathe operator; off-hand grinder; rough-grinder;
rough-grinder, hand.

D.O.T. Definition: Cleans and rough-finishes the surfaces of metal objects by holding them against the rotating abrasive wheel of a grinding lathe which is little more than a motor-driven horizontal axle on which one or more abrasive wheels are mounted; turns on electric motor to start machine; lifts object to be ground and rests it against a small shelf or rest adjacent to the wheel; presses work against wheel, turning it about with hands to accomplish the desired grinding.

Items Worked on in Plant Surveyed: Small castings2. Usual Operator:a. Sex: Maleb. General Characteristics: Any size, cautious, average mental ability, Negro workers frequently employed.3. Physical Demands:a. Activities: Standing, turning, lifting, reaching, pushing, pulling, handling, fingering, feeling.b. Working Conditions: Inside, dusty, noisy, adequate lighting and ventilation, mechanical hazards, works around others.c. Skill Required: Some skill. Ability to: judge the intensity and direction of light currents of air; accurately judge distance and direction of his hand and arm movements from a fixed working position; tactually differentiate between rough and smooth surfaces; feel rough, sharp areas of metal without cutting his fingers; exercise muscular control, especially of the hands and arms; locate items within arm's reach quickly and accurately; and judge amount of pressure to exert against a cutting wheel.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

FOUNDRIES

ROUGH GRINDER (Contd.)

4. Details of Physical Activities: Stands all day and works with hands and arms; turns to secure and dispose of material; reaches up to three feet to lift material weighing up to five pounds; handles, pushes and pulls pieces to bring them into contact with the abrasive grinding wheel; fingers and feels pieces to determine where grinding is necessary and when work has been completed.
5. Details of Working Conditions: Works around others, inside, in adequately lighted and ventilated area which is dusty because of metal particles thrown from the grinding wheel and noisy because of the operation of the grinder and other near-by machinery.
6. Hazards: The worker might receive serious lacerations of the hands, fingers or forearm from the rotating grinding wheel. This hazard will be substantially reduced if the worker will observe ordinary safety precautions, judge the position of the grinding wheel and the proximity of his hands to it by the current of air it throws off, use the rest plate as a guide, and always keep his work between his fingers and the wheel.
7. Sequence of Steps in Position in Plant Surveyed:
Worker:
 - a. Obtains a casting from truck at right, which has been put in place by another worker.
 - b. Using both hands, determines what rough spots need to be ground off. (Sighted workers would make this determination visually.)
 - c. Holding the piece with both hands and using the rest table to support the piece, as well as for locating position, pushes the part to be ground against the rotating wheel.
 - d. Follows around the piece, exerting the necessary pressure against the wheel, until the rough grinding has been completed.
 - e. After examining it tactually to make sure that he has completed his grinding, places piece on truck at left for removal by another worker. (Sighted workers make this determination visually.)

FOUNDRIES

ROUGH GRINDER (Contd.)8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Double-end bench grinder with small material rest and material trucks.
- b. Set-up and Maintenance: Provided by maintenance man.
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants. May have work table surrounding the wheel; may or may not have hoods to protect eyes from dust or chips thrown from the wheel.

- 10. Usual Pre-employment Training: None. Previous factory experience is helpful.
- 11. Usual Training Procedure on the Job: Supervisor instructs worker in all steps of the operation.
- 12. Any Training Deviations Suggested for the Blind: No training deviations for the blind worker with former machine work experience. When workers are inexperienced in operating power equipment, they should have three or four weeks' training such as is given in a vocational school. The employment counselor should plan the content of the training and take such steps as are necessary to insure its effectiveness. This will give him confidence, a working knowledge of and familiarization with machinery, machine noises, proper safety procedures, and tends to make him a desirable employee.
- 13. Production:
 - a. Full: Not established because of variation in the size of pieces.
 - b. Time to Reach Normal Efficiency: Approximately four weeks.
- 14. Interrelation with Preceding and Succeeding Jobs: Not significant.
- 15. Teaming with Other Workers: None
- 16. Modification, Deviation, Special Tools for the Blind: None

FOUNDRIES

ROUGH GRINDER (Contd.)17. Sight Requirements and Conditions:a. Vision Required for the Job: Noneb. Conditions Affecting Suitability of a Particular Job:

1. For the Totally Blind: No travel to secure and dispose of material.
2. For the Partially Sighted: Sight and travel requirements, as well as dust conditions and the degree of lifting, must be compatible with the type and amount of vision and eye condition of the worker.

18. Avoid the Following Conditions: Transfer to other jobs which have not been approved as suitable for performance without the use of sight.

19. Other Jobs Often Combined for Full Time Employment: Packing castings for shipment.

20. Industries, Parts of Industries or Types of Jobs Where This Type of Job is Frequently Found:

Any foundry - especially gray and malleable iron.

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D. C.

September 14, 1953

REHABILITATION SERVICE SERIES NUMBER 58 - SUPPLEMENT 15

To: Divisions of Vocational Rehabilitation (in States with no separate agency for the Blind); Commissions and Other Agencies for the Blind

Subject: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category SI-6, Sand Shake-out

The attached job description in the foundry industry is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as an additional job to the sixth category, Part I, Specific Industries Series. Like the jobs already issued in this category it has been observed and tested by a blind member of the staff of the section of Services for the Blind.

Additional copies of the Handbook or any of its supplements will be furnished upon request. We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

D. H. Dabelstein
D. H. Dabelstein
ASSISTANT DIRECTOR

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FOUNDRIES

SAND SHAKE-OUT1. Name Used for Position in Plant Surveyed: Sand RiddlerD.O.T. Title: Sand-Screener Operator

Code: 8-82.10

Alternate Titles: Laborer

D.O.T. Definition: Sifts foundry sand through a motor-driven riddle (screen) to prepare it for use by workers making cores or molds. Shovels sand into the riddle.

Items Worked on in Plant Surveyed: Sand to be cleaned for use in making of cores or molds.

2. Usual Operator:a. Sex: Maleb. General Characteristics: Any size, average mental ability.3. Physical Demands:a. Activities: Standing, turning, bending, stooping, shoveling, stretching, lifting, fingering, and feeling.b. Working Conditions: Inside, dusty, noisy, inadequate lighting, properly ventilated, non-hazardous, works in corner by self.c. Skill Required: Unskilled. Ability to: identify the scope of the work area and judge distance in order to shovel sand from bin to riddle without spilling it; recognize when riddle is loaded to capacity; locate switch and turn power on and off without fumbling and with no lost motion; shovel a sufficient amount of sand to meet the needs of the molders; and determine when riddle is empty and ready for re-loading.4. Details of Physical Activities: Stands all day; works with a bending motion, using hands, arms, and back; shovels sand from bin to riddle; reaches to riddle, locates, fingers, and feels electric button to start and stop machine.

FOUNDRIES

SAND SHAKE-OUT (Contd.)

5. Details of Working Conditions: Works alone in noisy, poorly lighted, but properly ventilated quarters. Work is dirty as air contains an excessive amount of dust because of shoveling sand and the vibration of the machine.

6. Hazards: There are no particular hazards.

7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Takes sand from bin at left which has been put there by another worker.
- b. Empties shovel of sand into riddle which is stationary at the worker's right.
- c. Reaches with hand and presses button to start machine.
- d. Determines when sand has been screened of impurities.
- e. Reaches and presses button to stop machine.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Machine known as "riddle," which is used to sift impurities from sand to be used in making molds. Shovel to be used in transporting sand from bin to riddle. No other equipment necessary.
- b. Set-up and Maintenance: Provided by maintenance man.
- c. Modification: None.

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants. However, some of the smaller plants have the molders sift the sand by hand for their own specific jobs. In some plants having less modern equipment, sand is shoveled through a stationary screen which is elevated at about a 60 degree angle.

10. Usual Pre-Employment Training: None. Previous work experience is helpful.

11. Usual Training Procedure on the Job: Supervisor instructs worker in all steps of the operation.

FOUNDRIES

SAND SHAKE-OUT (Contd.)

12. Any Training Deviations Suggested for the Blind: No training deviations for blind workers. However, good orientation to the work area is necessary.
13. Production:
 - a. Full: No specific number of pounds or quantity of sand to be shoveled required. However, a sufficient quantity of sifted sand must be available at all times to meet the needs of the molder or the core maker.
 - b. Time to Reach Normal Efficiency: Approximately two days.
14. Interrelation with Preceding and Succeeding Jobs: Failure on the part of the worker to keep sand available to core makers and molders would retard production.
15. Teaming with Other Workers: None.
16. Modification, Deviation, Special Tools for the Blind: None.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel to secure and dispose of material.
 2. For the Partially Sighted: Sight and travel requirements, as well as dust conditions and the degree of lifting and shoveling must be compatible with the type and amount of vision and eye condition of the worker.
18. Avoid the Following Conditions: Transfer to other jobs which have not been approved as suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: In small plants sand shake-out and core making or molding are frequently combined into one job to make full-time employment.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found: Foundries or plants that have their own foundries where sand is required to be screened for use in making molds. The sand may have impurities, such as twigs, pieces of clay, etc., and if the sand is not screened, the mold will crack. Frequently the sand is used several times. In this event, it is also necessary to remove small particles of molten metal which have become hardened.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D. C.

November 30, 1949

REHABILITATION SERVICE SERIES NUMBER 58 - SUPPLEMENT 9

To: Divisions of Vocational Rehabilitation (in States with
no separate Agency for the Blind); Commissions and Other
Agencies for the Blind

Subject: Supplement to Handbook of Representative Industrial
Jobs for Blind Workers - Category SI-7, Garment Industry.

The attached material on the Garment industry is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as the fifth category in Part I, Specific Industry Series. It describes a few of the jobs in this industry and is not intended to be all inclusive of all possibilities for blind workers. Like the jobs described in the first issue, those in this category have been observed and tested by a blind member of the staff of Services for the Blind.

Other categories of job specifications are being prepared and will be forwarded to you at an early date. Additional copies of the Handbook or any of its supplements will be furnished upon request. We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

D. H. Dabelstein
Donald H. Dabelstein
ASSISTANT DIRECTOR

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRY SERIES

Category SI-7

CLOTHING INDUSTRY

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The above list only partially represents the employment opportunities for blind persons in this category and specifications for others will be issued as circumstances permit. Additional jobs such as the following should be sought and all jobs must be carefully analyzed for suitability under the conditions found in a particular plant:

All Types of Turning Operations

Attaching Adjustable Clips or Buckles

Machine Pressing of Small Items

Folding Operations

HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRY SERIES

CLOTHING MANUFACTURING INDUSTRY

General Information Sheet

Character of the Industry: The jobs described in this category will be found in establishments engaged in the manufacture of cloth wearing apparel other than hats, caps, gloves, shoes, and that made completely by knitting. The industry is divided into five main branches; namely, (1) men's cotton collars, nightwear, shirts, and work clothing; (2) men's furnishing goods; (3) men's, youths', and boys' clothing; (4) women's, misses', and children's apparel; and (5) miscellaneous apparel and allied products such as handkerchiefs and gloves made from purchased fabrics.

There are two types of establishments in each branch (1) Inside shops are those which purchase manufactured cloth, cut it, and completely make it into the finished article; and (2) contract shops which make garments from cloth purchased already cut.

In 1946 the industry employed slightly more than one million wage earners. The plants varied in size from those employing several hundred workers to those employing only a few. A high degree of mechanization will be found throughout the industry. Specialization is practiced generally, thus the plant which manufactures women's dresses would probably not manufacture anything even so closely allied as women's blouses.

Distribution of the Industry: Although there is a continuing tendency toward decentralization, the majority of the plants will be found east of the Mississippi River with the highest centralization in the Middle Atlantic States.

Type of Workers Usually Employed: Female workers predominate. Because of the high degree of mechanization, a great majority of garment occupations are semiskilled machine operations; a large group involve mainly semiskilled hand sewing; a similar numerical group is unskilled.

Working Conditions: Working conditions compare favorably with the most modern factory working conditions of other industries. Day work prevails. The piecework system will be found in one form or another in most plants. Occasionally plants appear to be cluttered with little attention being paid to the flow of the

GARMENT MANUFACTURING INDUSTRY

General Information Sheet (Contd.)

work because individual tables and machines are arranged to utilize available light, space, and power connections. The industry is highly unionized with an average hourly rate throughout the industry of \$.921 per hour. Adequate lighting and ventilation usually exist, although some of the small establishments pay little attention to this factor.

Hazards, Safety Precautions, and Health Conditions: The principal dangers of injury to garment workers are laceration of fingers by sewing machine needles, serious cuts from electrical cutting machines, and burns from hot irons or pressing machines. The burns and sewing machine needle punctures, while painful and entailing danger of infection, rarely result in prolonged disability. The injuries inflicted by the electric cutting machine may be very serious, frequently entailing the loss of fingers; however, only a very few of the more skilled garment workers have occasion to use the machine.

General Coverage Jobs Pertinent:

- a. Carton Set-up in GC-1
- b. Wrapping and Packaging GC-2
- c. Material Handling GC-3

Jobs Usually to be Avoided Although Seemingly Suitable:

- a. Power sewing machine operations

Combination Jobs: (Jobs often combined to provide full-time employment)

- a. Collar turning
- b. Cuff turning
- c. Pocket turning

GARMENT INDUSTRY

COLLAR POINTER1. Name Used for Position in Plant Surveyed: Collar PointerD. O. T. Title: Collar PointerCode: 6-27.211Alternate Titles: Block Tipper

D. O. T. Definition: Operates collar-pointing machine to shape and press the points at the front of collars. Inserts die into unfinished collar. Places collar and die on buck (lower jaw) of press. Steps on pedal to close press. Releases pedal, removes collar, and pulls collar from die.

Items Worked on in Plant Surveyed:

Shirt collars

2. Usual Operator:a. Sex: Femaleb. General Characteristics: Any size, nimble, average mental ability.3. Physical Demands:a. Activities: Sitting, turning, reaching, handling, fingering, feeling, talking, hearing, working speed.b. Working Conditions: Inside, adequate lighting and ventilation, noisy, works around others.c. Skill Required: Ability to distinguish between smooth and rough surfaces; to manipulate light weight materials with the fingers; to coordinate the movement of hands and feet and to locate items accurately within arm's reach.4. Details of Physical Activities: Sits all day and works rapidly with hands and arms; continually reaches up to 2 feet to secure and dispose of material; fingers and feels cloth fabric to adjust it on a form so that the surface is free from wrinkles;

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

GARMENT INDUSTRY

COLLAR POINTER (Contd.)

handles light-weight material to place it on and remove it from shaping form; talks and listens to other workers to exchange necessary information.

5. Details of Working Conditions: Works around others inside in adequately lighted and ventilated room which is noisy because of the operation of near-by power sewing machines.
6. Hazards: There is a possibility of receiving a slight burn from the heated portion of the pointing machine. In order to come in contact with this portion, the operator would have to reach at least a foot beyond the point where the collars are placed onto the pointing forms. This motion is unnecessary in the performance of the job. However, the operator should be familiar with this portion of the machine in order that she may avoid touching it.
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

 - a. Takes a collar from the bin at left and slips one end of it over the pointing form.
 - b. Smooths out all wrinkles, making sure that the point of the form extends as far into the point of the collar as possible.
 - c. Depresses foot pedal to move the form onto an electrically heated die which smooths the collar point with heat and pressure.
 - d. After a few seconds, releases foot pedal to return the pointing form to its original position and removes the collar, checking with the fingers to make certain that the collar point is smooth.
 - e. Slips the other point of the collar onto the pointing form and repeats the process after which the finished collar is placed on a portable rack at the right for removal by another worker.
8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Collar pointing machine; work table and portable racks.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

GARMENT INDUSTRY

COLLAR POINTER (Contd.)

b. Set-up and Maintenance: All adjustments to the machine are made by another worker. Occasionally the operator may be required to change the pointing form in order that it might fit the particular style of collar to be shaped.

c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Some collar-pointing machines have two pointing forms so that both ends of the collar may be pointed at one time. In some plants the pointing form is placed on the buck of a small pressing machine, and a heated head is brought down onto it manually. A few manufacturers still use a hand iron for this operation.

10. Usual Pre-Employment Training: None

11. Usual Training Procedure on the Job: Supervisor instructs a new worker in all steps of the operation.

12. Any Training Deviations Suggested for the Blind: None

13. Production:

a. Full: 15 to 18 dozen collars per hour.

b. Time to Reach Normal Efficiency: Two weeks.

14. Interrelation with Preceding and Succeeding Jobs: This is the final operation on the collar before it is attached to the shirt, and the worker must be sure that the collars are ready for this operation. Otherwise, production will be adversely affected.

15. Teaming with Other Workers: None

16. Modification, Deviation, Special Tools for the Blind: None

17. Sight Requirements and Conditions:

a. Vision Required for the Job: None

b. Conditions Affecting Suitability of a Particular Job:

1. For the Totally Blind: No travel beyond work area to

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

GARMENT INDUSTRY

COLLAR POINTER (Contd.)

secure and dispose of material and no sorting according to color or job tickets.

2. For the Partially Sighted: Determination of color and requirement for reading job tickets or other instructions should be compatible with the type and amount of the worker's vision.
18. Avoid the Following Conditions: Transfer to other jobs not suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: Collar trimming or collar turning.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:
Manufacturing men's dress shirts.

GARMENT INDUSTRY

COLLAR-POINT TRIMMER

1. Name Used for Position in Plant Surveyed: Collar-Point Trimmer

D. C. T. Title: Collar-Point Trimmer

Code: 8-27.01

Alternate Titles: None

D. O. T. Definition: A laborer. Cuts away, with a collar-trimming machine, waste seam material near the points of collar before the collars are reversed to prevent the formation of lumps at the collar points; Places collars, which are inside out, in position under the knife on the machine and presses a pedal, causing knife to descend and shear away excess seam material at collar points.

Items Worked on in Plant Surveyed:

Collars for men's dress shirts.

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Any size, nimble, average mental ability.

3. Physical Demands:

a. Activities: Sitting, turning, reaching, handling, fingering, feeling, talking, hearing, working speed.

b. Working Conditions: Inside; adequate light and ventilation; noisy; works around others.

c. Skill Required: Ability to manipulate light fabrics quickly; to locate items within arm's reach correctly and quickly; and to coordinate the movements of hands and feet.

4. Details of Physical Activities: Sits all day; turns and reaches a few feet to right or left to secure and dispose of material weighing only a few ounces; fingers and feels light-weight fabrics to fit them smoothly onto a form; talks with and listens to others to exchange necessary information.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

GARMENT INDUSTRY

COLLAR-POINT TRIMMER (Contd.)

5. Details of Working Conditions: Works around others, inside, in adequately lighted and ventilated area which is noisy because of the operation of near-by power sewing machines.
6. Hazards: The worker could receive severe lacerations of the fingers or hands if he did not keep them away from the trimming die when he depressed the foot pedal to bring the blade down to trim the excess material from the collar-point seam. The average good judgment of the operator should reduce this hazard to a minimum.
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

 - a. Takes a collar which is wrong side out and places it over the upright pointed form of the collar-trimming machine, making sure that the collar-point seams are as close to the inserted form as possible and that the tip of the form fits snugly into the tip of the collar.
 - b. Pushes the form which is hinged to the machine forward and down until it comes in close contact with the lower die.
 - c. Making sure that his hands are completely away from the die, depresses foot pedal, causing the knife to descend and shear away the excess seamed material near the point of the collar; releases foot pedal and with one motion; returns the form to its original position; and removes the collar.
 - d. Repeats the operation on the other point of the collar and places it in bin at right for removal to another worker.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Collar-trimming machine; work table; and movable stock bins.
 - b. Set-up and Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:

Essentially the same in all plants. Some manufacturers still use scissors to trim the collar points.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

GARMENT INDUSTRY

COLLAR-POINT TRIMMER (Contd.)

10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Supervisor instructs new worker in all steps of the operation.
12. Any Training Deviation Suggested for the Blind: None
13. Production:
 - a. Full: 15 to 18 dozen per hour.
 - b. Time to Reach Normal Efficiency: 2 weeks.
14. Interrelation with Preceding and Succeeding Jobs: The careful trimming of the collar will result in the neater appearance of the collar when it is turned.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel outside the work area to secure and dispose of materials and no requirements for the inspection of stitching, sorting according to color, or the reading of job tickets.
 2. For the Partially Sighted: Requirements for color sorting as well as the reading of job tickets should be compatible with the type and degree of the worker's vision.
18. Avoid the Following Conditions: Transfer to other jobs which cannot be performed without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: Collar turning; collar pointing.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

Garment factories manufacturing men's dress, sport, or work shirts and men's nightwear.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

GARMENT INDUSTRY

COLLAR TURNER1. Name Used for Position in Plant Surveyed: Collar Turner

D. O. T. Title: Collar-Top Turner

Code: 8-27.01Alternate Titles: NoneD. O. T. Definition: Pulls point of collar onto a thin rod.

Pushes a pedal that causes another rod to move until its end rests against the end of the first rod with the collar point between. Pulls collar from first rod to second, thus turning collar inside out. Releases pedal. Lifts collar from second rod.

Items Worked on in Plant Surveyed: Shirt collar2. Usual Operator:a. Sex: Femaleb. General Characteristics: Any size, quick movements especially of the hands, average mental ability.3. Physical Demands:a. Activities: Sitting, turning, reaching, pushing, pulling, handling, fingering, feeling, working speed.b. Working Conditions: Inside, adequate lighting and ventilation, noisy, working around others.c. Skills Required: Ability to differentiate between textures of cloth; to locate items quickly and accurately within arm's reach; to exercise muscle control; to coordinate the movements of hands and feet; and to manipulate flimsy material with the fingers quickly.4. Details of Physical Activities: Sits all day and works rapidly and continually with hands, arms, and one foot; constantly turns and reaches to secure and dispose of material; constantly handles, fingers, and feels light-weight fabric to determine the progress and accuracy of the work; pushes and pulls this material to accomplish the assigned tasks.5. Details of Working Conditions: Works around others, inside, adequately lighted and ventilated area, noisy because of the operation of near-by high-speed power sewing machines.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES. .

GARMENT INDUSTRY

COLLAR TURNER (Contd.)

6. Hazards: The operator could catch his finger between the points of the turning rods when they were brought together. However, no serious injury would result since one of the points is controlled by a light spring which permits it to recede into the main rod when it comes in contact with a solid object.

7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Obtains an unturned collar from rack at left and slides it over the lower turning rod so that the rod is between the two pieces of garment fabric making sure that the point of the rod extends as far into the point of the collar as possible without piercing the stitching.
- b. Depresses foot pedal until the point of the upper rod rests against the end of the lower one with the collar points between.
- c. Using the fingers of both hands, pulls collar up on to second rod thus turning it right side out.
- d. Releases foot pedal and removes collar from upper rod.
- e. Repeats this operation on the other point and places the completely turned collar on rack at right for removal by another worker.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Movable material racks, work table, collar turning machine with foot pedal.
- b. Set-up and Maintenance: None
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants.

10. Usual Pre-employment Training: None

11. Usual Training Procedure on the Job: Supervisor instructs worker in all steps of the operation.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

GARMENT INDUSTRY

COLLAR TURNER (Contd.)

12. Any Training Deviations Suggested for the Blind: None
13. Production:
- a. Full: 15 dozen per hour
 - b. Time to Reach Normal Efficiency: One week
14. Interrelation with Preceding and Succeeding Jobs: Collars come to this worker from the collar trimmer and go to the collar pointer. The production of these three operations is approximately the same; therefore, any lag in the production of the collar turner will affect production of the collar pointer.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
- a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 - 1. For the Totally Blind: No travel to secure and dispose of material and no checking of job or lot tickets.
 - 2. For the Partially Sighted: Travel outside the work area, and the requirement for checking of job and lot tickets must be compatible with the eye condition and the type and amount of the worker's vision.
18. Avoid the Following Conditions: Inspection of stitching and sorting of colors.
19. Other Jobs Often Combined for Full-Time Employment: This job may logically be combined with (1) that of turning cuffs or pockets; (2) trimming collar points; and (3) pressing collar points.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

Garment factories manufacturing men's dress, sport, or work shirts and men's nightwear.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

GARMENT INDUSTRY

LEG PRESSER1. Name Used for Position in Plant Surveyed: Leg PresserD. O. T. Title: Presser, machineCode: 7-57.51

Alternate Titles: Cylinder-press operator; finisher, machine; flattening-machine operator; pressing-machine operator; press operator; steam flattener; steam-heated-power-press operator; steam presser; steam-press operator.

D. O. T. Definition: Smooths the surfaces of garments, drapes, slip covers, and other shaped fabric articles with a pressing machine to shape the articles, to remove wrinkles, and to flatten seams; Spreads part of article on padded table (buck) of machine. Pulls top half (pressing head) of machine down over buck, locking head in place. Depresses pedal to create vacuum, exhausting steam from press and drying article. Opens press and rearranges article, repeating until required pressing has been done. May operate two presses, loading one while the other is closed. May be designated according to the garment or part of garment worked on, as armhole-and-shoulder off-presser; band presser; coat presser; collar fuser; curtain and drapery presser; linen presser; men's garment presser; pants presser; shirt finisher; sleeve-and-shoulder presser; vest-front presser; wash-clothes presser; wool presser.

Items Worked on in Plant Surveyed: Men's inexpensive pants.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Robust, vigorous, average mental ability. In some areas colored workers are employed extensively on this job.

3. Physical Demands:

a. Activities: Standing, turning, reaching, lifting, pushing, pulling, handling, fingering, feeling, talking, hearing.

b. Working Conditions: Inside, hot, humid, adequate lighting and ventilation, exposure to burns, works around others.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

GARMENT INDUSTRY

LEG PRESSER (Contd.)

- c. Skill Required: Ability to locate items quickly and accurately within arm's reach, to determine texture of cloth, to coordinate the movements of both hands and feet, and to distinguish between smooth and rough surfaces.
4. Details of Physical Activities: Stands all day; works rapidly with hands, arms, and both feet; continually turns and reaches to secure and dispose of material; pushes, pulls, and handles garment fabrics to position them correctly; pushes and pulls levers to operate the pressing machine; fingers and feels garments to determine the progress of the work; talks with and listens to others to exchange necessary information.
5. Details of Working Conditions: Works inside around others in adequately lighted and ventilated area which is hot and humid because of escaping steam.
6. Hazards: Worker is exposed to burns from steam or from contact with the pressing head of the machine. These hazards can be reduced to a minimum if worker is taught to follow a definite pattern of safety for his movements throughout the pressing cycle. This pattern should include a method of approaching the machine safely whether the steam is on or off or whether the pressing head is up or down. A method of following safe paths from the original safe point of contact to all the controls and a method of safely determining whether there is steam in the press. This can usually be accomplished if the worker will approach the machine with his hands at his side, slightly ahead of him and with their backs toward the machine; thus the back of the hand will first touch the pressing table. He may then locate the center of the machine by finding the center notch in table and by feeling for the foot pedals with his feet. Safe paths to and from the various controls will vary with the make and model of the pressing machine.
7. Sequence of Steps in Position in Plant Surveyed:
- Worker:
- a. Takes one pair of pants from rack at left and arranges them so that the crotch seam is approximately an inch and one-half beyond the end of the buck with the legs on the buck and the top on the table at the left.

GARMENT INDUSTRY

LEG PRESSER (Contd.)

- b. Lays the upper leg back on the trouser top so that when the head of the machine is brought down it will come in contact with only one leg.
- c. Adjusts the cuff end of the leg so that the lower edges are even and the side seams are together and holds in position while he
- d. Manipulates the upper end of the leg so that the side seams are together at that point and holds in position.
- e. Stretches the cloth gently to remove wrinkles and depresses foot pedal to create vacuum in the buck, thus holding the leg in place.
- f. Using both hands and working from the center of the leg out, smooths out all wrinkles.
- g. With the other foot depresses pedal to bring the head of the machine down to the buck and lock it in position (as the head approaches the buck, release the pedal controlling the vacuum).
- h. Presses the pedal to apply head steam and holds it down for a few seconds (the length of time depends upon the type of fabric being pressed) (in the case of closely woven dark woollens the head is not locked, and steam is applied as the head is gently brought to, and taken away from, the garment several times).
- i. Depresses foot pedal to release and open head.
- j. As soon as the head is away from the garment, depresses pedal to create vacuum and checks garment with the hands to make sure that there are no wrinkles.
- k. Releases foot pedal controlling the vacuum and lays the unpressed leg onto the pressed one.
- l. Turns the garment over and lays the pressed leg back on the trouser top.
- m. Repeats the same procedure followed on the first leg.
- n. Bring the cuffs of the two legs together evenly and drapes the trousers over the rack at the right, making

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

GARMENT INDUSTRY

LEG PRESSER (Contd.)

sure that the creases are in place and there are no wrinkles.

Note: When pressing pleated trousers the worker uses the crease made by the topper as a guide point for the upper part of the leg rather than placing the side seams together at the crotch as described in (d), making a continuous crease from the pleat to the cuff.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Hoffman steam press with special buck for trouser legs, rest table at left for trouser tops and movable rack.
- b. Set-up and Maintenance: All adjustments to the machine are made by another worker.
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants except that various makes and models of steam presses will be found.

10. Usual Pre-employment Training: Training is usually received through:

- a. A course in a vocational school.
- b. Work as an apprentice in a cleaning and dyeing establishment.
- c. Through observation of other workers.
- d. Step-by-step instruction by a supervisor.

11. Usual Training Procedure on the Job: Supervisor instructs new worker in all steps of the operation.12. Any Training Deviations Suggested for the Blind: It would be advisable to provide training in a local pressing establishment or a vocational school where the trainee could become familiar with the pressing machine and its various controls. During this period he should also be taught to follow a pattern for safe operation in order to avoid burns which could easily be received from contact with the heated portion of the machine.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES.

GARMENT INDUSTRY

LEG PRASSEUR (Contd.)

13. Production:
 - a. Full: 30 to 50 pair per hour.
 - b. Time to Reach Normal Efficiency: Two weeks.
14. Interrelation with Preceding and Succeeding Jobs: This is usually the final operation on the trousers before they go to the inspectors and packers; consequently, the trousers must be ready for shipment to the customer.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: The work should be so regulated that trousers which are susceptible to shine, such as gabardine and those made of dark closely woven material, are routed to other workers.
 2. For the Partially Sighted: Adequate lighting and requirements for color perception should be compatible with the worker's type and amount of vision.
18. Avoid the Following Conditions: Requirements for shaping trousers; sorting according to job tickets, patterns, or colors; and transfer to other jobs not suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: None
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

Manufacturers of men's inexpensive clothing or work pants.

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D. C.

September 14, 1953

REHABILITATION SERVICE SERIES NUMBER 58 - SUPPLEMENT 16

To: Divisions of Vocational Rehabilitation (in States with no separate agency for the Blind); Commissions and Other Agencies for the Blind.

Subject: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category SI-7, Sleeve Presser

The attached job description in the garment industry is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as an additional job to the seventh category, Part I, Specific Industries Series. Like the jobs already issued in this category it has been observed and tested by a blind member of the staff of the section of Services for the Blind.

Additional copies of the Handbook or any of its supplements will be furnished upon request. We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

D. H. Dabelstein
D. H. Dabelstein
ASSISTANT DIRECTOR

DISTRIBUTION
Direct Mailing
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GARMENT INDUSTRY

SLEEVE PRESSER

1. Name Used for Position in Plant Surveyed: Sleeve Presser

D.O.T. Title: Presser, Machine

Code: 7-57.511

Alternate Titles: Cylinder-press operator; finisher, machine; flattening-machine operator; pressing-machine operator; press operator; steam operator; steam-heated-power-press operator; steam presser; steam-press operator.

D.O.T. Definition: Smooths the surfaces of garments, drapes, slip covers, and other shaped fabric articles with a pressing machine to shape the articles, to remove wrinkles, and to flatten seams. Spreads part of article on padded table (buck) of machine. Pulls top half (pressing head) of machine down over buck, locking head in place. Depresses pedal to create vacuum, exhausting steam from press and drying article. Opens press and rearranges article, repeating until required pressing has been done. May operate two presses, loading one while the other is closed. May be designated according to the garment or part of garment worked on, as armhold-and-shoulder off-presser; band presser; coat presser; collar fuser; curtain and drapery presser; linen presser; men's garment presser; pants presser; shirt finisher; sleeve-and-shoulder presser; vest-front presser; wash-clothes presser; wool presser.

Items Worked on in Plant Surveyed: Men's coats

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, nimble, quick and steady, and with average mental ability. Temperament suited for rapid, continuous machine operation. Not sensitive to heat given off by steam press.

3. Physical Demands:

a. Activities: Walking, standing, turning, reaching, carrying, fingering, handling, feeling.

b. Working Conditions: Inside, humid, hot, odorous, noisy, adequate lighting, adequate ventilation, works around others.

c. Skill Required: Semi-skilled. It is essential that the operator: have good hand and foot coordination as both feet and hands are used concurrently; be skillful in using the hands to pull the head of the machine down on the material which has been placed on the the buck; with his foot, hold the head against the material without

SLEEVE PRESSER (Contd.)

locking and with the right hand pull the steam lever which permits air to flow through the buck and remove the shine from the material being pressed.

4. Details of Physical Activities: The worker may stand at his machine all day. Walks a distance of about three or four feet, continually turns and reaches to secure and dispose of garments, pushes and pulls levers and steps on pedals to operate the pressing machine; and controls the flow of steam and air through pressing buck.
5. Details of Working Conditions: Works inside around others in adequately lighted and ventilated area which is hot and humid because of escaping steam. Because of the extreme heat from the steam press, the operator should wear light clothing.
6. Hazards: Worker is exposed to burns from steam or from contact with the pressing head of the machine. These hazards can be reduced to a minimum if worker is taught to follow a definite pattern of safety for his movements throughout the pressing cycle. This pattern should include a method of approaching the machine safely whether the steam is on or off, or whether the pressing head is up or down; a method of following safe paths from the original safe point of contact to all the controls; and a method of safely determining whether there is steam in the press. This can usually be accomplished if the worker will approach the machine with his hands at his side, slightly ahead of him and with the backs toward the machine; thus the back of the hand will first touch the pressing table. He may then locate the center of the machine by finding the center notch in table, and by feeling for the foot pedals with his feet. Safe paths to and from the various controls will vary with the make and model of the pressing machine.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Worker faces bar holding men's coats. With right hand takes hanger holding coat from bar, removes coat from hanger with left hand and places hanger on to bar with right hand; makes a complete turn, walks to machine and lays coat on to apron of machine.
 - b. Picks up sleeve of coat and pulls over buck of machine with the inside crease of sleeve centering the buck.
 - c. With left hand reaches and grasps handle on head of machine and pulls it down toward buck; with right foot steps on center pedal and locks head down to buck; with right hand grasps and pulls steam lever which is located in the center of the head, and holds for an instant to release steam; with right foot steps on right pedal at the right of center pedal to release locked head; with left foot steps on vacuum pedal at left of center to dry pressed material.

SLEEVE PRESSER (Contd.)

d. Takes damp cloth in hands and places over pressed material, repeats the previous operation without locking the pedal to the buck. With the right foot on the center pedal, holds the head to the material being pressed. Again apply steam from the head, release, then dry material by stepping on vacuum pedal which is located at the left of center pedal. The second operation is to remove shine from material caused by first pressing which was to remove a pressed crease. This process is repeated with the second sleeve; worker then turns and walks to bar holding coat by the neck with left hand; removes hanger from bar with right hand, puts it into coat, hangs it back on the bar, and pushes it to the right for another operator, who is not more than two feet away.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Sleeve Pressing Machine using live steam in head only.
- b. Set-up and Maintenance: All set-up and maintenance is performed by a maintenance man.
- c. Modification: None.

9. Equipment Variations Which May be Found in Other Plants: The only variation is in the type of machine used. The sequence of work steps is the same regardless of the type of machine used.

10. Usual Pre-Employment Training: Training is usually received through:

- a. A course in a vocational school
- b. Work as an apprentice in a cleaning and dyeing establishment.
- c. Through observation of other workers.
- d. Step by step instruction of a supervisor

11. Usual Training Procedure on the Job: The foreman usually instructs the worker in the operations of the machine as well as methods of handling the materials to be pressed.

12. Any Training Deviations Suggested for the Blind: It would be advisable to provide training in a local pressing establishment, or a vocational school, where the trainee could become familiar with the pressing machine and its various controls. During this period he should also be taught to follow a pattern for safe operation, in order to avoid burns which could easily be received from contact with the heated portion of the machine.

GARMENT INDUSTRY

SLEEVE PRESSER (Contd.)13. Production:

- a. Full: 50 coats per hour.
- b. Time to Reach Normal Efficiency: An experienced worker may come up to full production in one to three hours. An inexperienced worker starting on a simple operation, may take as long as six weeks to reach full production and efficiency.

14. Interrelation with Preceding and Succeeding Jobs: This pressing operation is only one of several pressing operations done on the same coat. Each worker operates a different type of press designed to press different parts of the coat; therefore, the operator must handle all the garments that come to him in order that he will not hold up the production of the worker performing the succeeding operation.

15. Teaming with Other Workers: None

16. Modification, Deviation, Special Tools for the Blind: None

17. Sight Requirements and Conditions:

- a. Vision Required for the Job: None
- b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: His work should be checked by a sighted person to make sure that all shine has been removed from the material.
 2. For the Partially Sighted: Lighting and degree of heat should be compatible with the worker's type and amount of vision.

18. Avoid the Following Conditions: Tallying of time sheets.

19. Other Jobs Often Combined for Full-Time Employment: This job might be combined with job of creasing sleeves in a small plant, to make a full-time job.

20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found: Clothing manufacturers - usually the ones which manufacture men's suits and coats.

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D. C.

June 22, 1953

REHABILITATION SERVICE SERIES NUMBER 53 - SUPPLEMENT 14

To : Divisions of Vocational Rehabilitation (in States with no separate agency for the Blind); Commissions and Other Agencies for the Blind.

Subject: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category SI-8, Automotive Servicing.

The attached material on Automotive Servicing is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as the eighth category in Part I, Specific Industry Series. It describes only one of the jobs in Automotive Servicing and is not intended to be all inclusive of the possibilities for persons without sight. Like the jobs described in the first issue, this job has been observed and tested by a blind member of the staff of Services for the Blind.

Additional copies of the Handbook or any of its supplements will be furnished upon request. We trust that this material will be helpful, and would appreciate any suggestions for improvement which you might have to offer.

D. H. Dabelstein

Donald H. Dabelstein
ASSISTANT DIRECTOR

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRY SERIES

AUTOMOTIVE SERVICING

General Information Sheet

Character of the Industry: Due to the continuing decentralization of industry which draws manpower from the widely scattered areas, and the deterioration of public transportation facilities, the maintenance of privately owned motor vehicles has become most essential.

The booklet, "Automobile Facts and Figures," published by the Automobile Manufacturers Association in 1951, gives the following interesting information on the use and importance of motor vehicles in the United States:

"92% of cars are used each week for work, shopping, or both. 27.5% million persons use passenger cars daily for earning a living. 66.5% of all households in the U.S. own cars, while 70.6% of farm households own one or more cars. 80% of households in the West, 76% in North Central States, 60% in Northeastern States, and 57% in Southern States, own automobiles. In 1950, there were 8,637,969 trucks and 40,315,175 passenger cars registered in the U.S. In 1949, the average age of cars scrapped was 14 years, and the average accumulative mileage was 120,500 per car. Average annual mileage per car decreases with age, from 12,260 in first year to 5,890 for cars 14 years or over. Experience has shown that motor vehicles require relatively minor adjustments through the first 2 years. Moderate repairs are required during the third year. The major repair period for motor vehicles is between 3 and 10 years of age."

The Automotive Servicing industry includes practically everything that happens to a motor vehicle in the way of furnishing supplies, service, and maintenance from the time it is sold to the first user until it is sold to the junk man. It includes also the care of the power units for motorized work equipment such as bulldozers, tractors, and construction contractor's equipment. Most of the automotive equipment is powered by a carbureting type internal combustion engines.

The Automotive Servicing industry includes the service station operation which supplies fuel, lubricating oil, tires, batteries, and chassis lubrication. To a large extent, the supplying of these services is in proportion to the mileage the vehicle is

General Information Sheet (Cont'd)

driven. The industry also provides a diversified assortment of mechanical services ranging from minor adjustments, such as the tightening of bolts and the replacement of fan belts which can be done by an inexperienced mechanic, to more complicated functions, such as the tune-up of the ignition and carburetor systems, the diagnosing of trouble, and general motor overhauling and rebuilding. These more complicated functions require higher degrees of skill, not only in the manipulation of tools, but a thorough understanding of the principles under which each part functions. The operations involved in maintaining the running gear, such as adjusting and/or replacing of brakes and aligning the front wheels and steering mechanism, require good mechanical skill and, frequently, the use of testing equipment. The frequency of these mechanical adjustments, overhauling, and replacements is influenced by the mileage, the driving speed, the road conditions, and the quality and frequency of services.

Electric service, such as the overhauling of generators, starters, relays, repair and ignition adjustment, and the clearing of trouble in wiring, depends mainly on the mileage, but to some extent upon the severity of the treatment accorded the car.

Body and fender repair depends largely upon the skill and caution of the driver and the type of traffic encountered. The skill required in body and fender work varies considerably. The work may be replacing a crooked headlight, or ironing out simple dents in fenders; in other cases, the car may be almost demolished and require the replacement of whole body sections and a difficult frame straightening operation, necessitating the use of special equipment. As the industry is organized now, the auto-mechanic (or garage mechanic, including the electricians) functions by diagnosing the trouble, removing the part or parts which cannot be adjusted, replacing them with new or reconditioned parts, and adjusting the new parts.

The garage mechanic usually has very little machine work to do, for such work as re-boring cylinders, machining to final size of piston and wrist pin, the installing and fitting of new bearings, the truing of crank shaft bearing surfaces, the turning of scored brake drums, and grinding of shoes to fit, are usually done by another machine shop or organization. The exception is the large organization taking care of enough vehicles to enable them to have a special machine shop section. Sometimes small shops in remote areas may install the required machining equipment in order to do the work themselves and avoid the delay occasioned by having parts shipped from a distance. To assure the best possible adjustment of brakes and front wheel alignment, so essential to safety at high speed, this work must be done on special machines which are usually too expensive for a small shop.

General Information Sheet (Cont'd)

The majority of privately-owned repair shops are started from automobile sales organizations and are of the smaller variety. Shops may be classified according to the service rendered, the majority being general repair shops. Others specialize in wheel alignment, brake work, body repair, motor tune-up, radiator repair, carburetor and ignition repair and adjustment service, battery and automotive electrical equipment. The super-service station covers all types of repair, plus the inside type of service station for dispensing gasoline and oil.

According to the recommendations of the U.S. Department of Commerce in their booklet, "Establishing and Operating an Automobile Repair Shop," ^{1/} the small automotive repair shop is a good business in which a man with limited finances may start, provided he has all the essential qualifications of the trade. This booklet states that the cost of becoming established in this business is not excessive and proceeds to give estimated costs. Since these estimates were originally made in 1944, they have been increased according to the recommendations of purchasers of equipment experienced in this field, and are as follows for 1952:

Small shop, with 1 to 3 hired mechanics	1,200
Medium shop, with 4 to 6 mechanics	10,000
Large shop, 8 to 10 mechanics	20,000
Specialty shop, each specialty (brake lining, engine rebuilding, electric and tune-up jobs, testing and aligning)	2,000

When figuring on the floor space, the requirements for a car are 13 x 20 feet, and for a truck, up to 15 x 45 feet.

Mechanics should have easy access to the Parts Department. The shop must have good ventilation to quickly remove exhaust fumes. In a northern climate, good heating must be provided.

A mechanic having learned his trade, may start his own business by doing work for friends and acquaintances in his own garage during the evenings and Saturdays while still employed in a regular shop. If his work is good, he will gradually build up a greater demand for his services. At that time he should consider starting his own shop.

Based on the 1948 U.S. Census Report, it was shown that 61.7% of working mechanics are in independent general repair shops of two or less paid employees, and 71.6% are in shops of three or less. This shows that the smaller shops offer a greater number of employment

^{1/} May be obtained from the U.S. Department of Commerce.

General Information Sheet (Cont'd)

opportunities. A study of the annual Service Job Analysis data discloses the interesting fact that the average mechanic in an independent general repair shop handles 28.3 more major jobs yearly than the average mechanic in a car dealer's service shop.

Distribution of the Industry

The automotive service industry is located throughout the country and, in general, the number of establishments in any one locality varies with the size of the community and/or number of persons trading in the area. In urban areas some repair shops will be located near the business section, and others will be in or near the shopping centers serving the respective residential areas of the metropolitan community. This applies particularly to passenger cars and light delivery trucks. Small cities, towns, and villages will have sufficient repair and service stations to take care of the rural cars and trucks as well as those of the residents of the town. Shops catering especially to trucks are usually located near a freight terminal or factory area, while those catering to tourist and cross-country trade may be located at strategic points, such as a pass in the mountains or where two highways intersect. Shops in each type of location usually have emergency service cars and wrecking trucks operating out of their factory or warehouse, where they provide their own storage, repair, and maintenance service.

Transportation organizations, such as local and long distance bus and freight lines, maintain their own garage repair depots in each large center which they serve. One or more of their terminal shops may be equipped for complete rebuilding of trucks and buses. All parts are reconditioned or replaced with new ones. Some of the rebuilding shops may also have a section for retreading tires, sent in from other company garages, or tire recapping may be done by a tire manufacturer's branch shop.

The automobile repair business is most easily built around a service station; therefore, this should be kept in mind when selecting a location to start a shop. Consideration should be given to the customer's access to the station and shop. Some repair mechanics start their business by renting space in a large storage garage.

The owner of a business must realize that the work is tiresome, may be dirty, with long hours on the job, for the customer expects night-time and holiday service from the small as well as the large shop. Some essential qualifications for success in a small repair shop are: the worker must be a good mechanic, willing to learn everything about his

General Information Sheet (Cont'd)

business; be a good manager, keeping accurate records and books; have a good personality that will hold the old customers and gain new ones; be a good leader in order to direct his employees, yet retain their respect and good will; must have good business judgment to determine where and when to start his business and how to meet competition.

In the automobile service field, practically all workers are men except for secretarial and bookkeeping work. In some shops, unskilled workers hired as helpers, often develop into good mechanics. In service stations, boys of high school or college age are frequently hired for part-time work in rush hours and on week ends. Some employees get their first knowledge and appreciation of automobile service by keeping their own car in repair. An ever-increasing number get their first automotive training in vocational schools. In some cases mechanics are sent to automotive specialty training schools operated by the manufacturers.

As training aids, manufacturers furnish illustrated manuals explaining how to do each operation. Some mechanics, early in their career, operate a one-man shop of their own, eventually expanding it to the size of establishment which they can handle successfully. They often avail themselves of the information given in manufacturers' manuals. In order to be a successful automotive diagnostician, the mechanic, tester, or floor service man needs special training. Statistics from the Department of Labor, April-June 1951, show hourly wages for automobile service workers and mechanics range from \$0.69 to \$2.26. Most car owners are not in a position to do their own diagnostics and repairs so must rely upon the knowledge and integrity of the mechanic.

Working Conditions

There is an extremely wide range of working conditions to be encountered in this industry. Small shops just getting started are found often in old buildings which may be inconvenient and uncomfortable during extreme weather conditions. Cars are frequently very dirty on the underside -- a mechanic may have to lie on his back under the car, a very disagreeable working condition. Emergency road calls may require him to work outside in cold and wet weather. On the other hand, many shops are housed in up-to-date buildings, with good ventilation, arrangements for piping exhaust fumes out of the work room; and pneumatic hoists to lift the car to a position where the work may be done with greater ease and comfort. Chain blocks or other types of equipment are usually available for heavy lifting, such as removing the engine from the car.

Hazards, Safety Precautions, and Health Conditions

In general, there are no serious hazards connected with this industry. Minor hazards may be cuts and abrasions to the hands, the pinching of fingers, or injury to the feet from falling objects, such as wrenches or slipping of improperly placed hoist or jack. These wounds are subject to infection if proper first aid treatment is not given promptly. Burns from the hot exhaust pipe may be experienced when tuning up the engine. Most shops have first aid equipment adequate to cope with these situations. The worker may strain his back or muscles from lifting heavy equipment or from working in an awkward position. It is up to the mechanic to call for additional help when he is using heavy equipment.

When working underneath the car, particles of dirt or sand are liable to fall into the mechanic's eyes. Immediate steps should be taken to wash out such foreign matter. If the work areas are not adequately ventilated, the worker's health may become undermined by exhaust fumes. Skin irritations, such as rash, may result from the use of oil and cleaning solvents. It is dangerous to smoke around an automobile repair shop, because of the open container of gasoline and other solvents.

General Coverage Jobs Pertinent

Machine Operations (Metal working power tools). Machine operations may be found frequently in automotive machine shops and part supply houses. The general safety precautions prescribed in Machine Operations, GC-5, will apply equally well in the automotive service industry.

Jobs Usually to be Avoided Although Seemingly Suitable

- a. Glass Inspection and Replacement. Defects in door or windshield glass may be between the layers or may be indicated by discoloration so that they definitely cannot be detected by touch. Shattered glass gives many opportunities for cuts and damage to the worker's hands.
- b. Headlight Adjustment. This should be avoided although the mechanism can be manipulated without the use of sight. The determination of the correctness of the adjustment must be made by visual observation of the beam of light.
- c. Spotting and Touching up Damaged Finish must be avoided because matching and blending of the old finish should be done so as to give a good final appearance.

General Information Sheet (Cont'd)

- d. Body and Fender Repairing should usually be avoided depending upon the type of working arrangement, or depending upon the character of the residual vision.
- e. Tire Vulcanizing Operations. This work may be performed by a totally blind or partially sighted worker, but the skiving operation (removing the old tread with modern high power machines) is too rapid to judge the results by the feel of the casing, and the wheel is too fast and powerful for those with good partial vision to get close enough to see what is happening.
- f. The job of night mechanic must be studied very closely before approving it for a blind person. It entails the necessity of going out on trouble calls, requiring the driving of the company's truck or driving the customer to the shop.

Combination Jobs: (Jobs often combined to provide full-time employment)

This industry is so widespread, extensive, and varied that there are a large number of combinations which could be made to furnish full-time employment. Some of the best opportunities for combinations can be found in smaller shops where the blind mechanic can work on many operations with a sighted person who supplies the visual observations required. Combination jobs are:

- a. Chassis lubricator and gas pump attendant, for a partially sighted worker.
- b. Car washer and greaser, especially suitable for a partially sighted worker.
- c. Battery man, auto-electrician, ignition tune-up. Rebuild carburetor, ignition, fuel pump, starter and generator.
- d. Reconditioning of brake and shock absorber units. Replacement and adjustment of brakes and shock absorbers. (relining and adjusting brakes)
- e. Machine testing and adjusting of brake and front wheel alignment for a partially sighted worker.

AUTOMOBILE SERVICING

GENERAL MECHANIC

1. Name used for Position in Plant Surveyed: General Mechanic

D. O. T. Title: Automobile mechanic (auto. ser.)

Code: 5-21.010

Alternate Titles: Automobile repairman; automobile service mechanic; garage man; garage mechanic; garage repairman.

D. O. T. Definition: Repairs passenger automobiles and light delivery trucks, performing such duties as disassembling and overhauling engines; transmission, clutches, rear ends, and other assemblies on automobiles, replacing worn or broken parts, grinding valves, and adjusting brakes, tightening body bolts, and aligning wheels. Uses hoists, wrenches, gages, drills, grinding wheels, and other general or specialized machines, gages and tools. This worker may be restricted to the repair of automobile motors, transmissions, and clutches, the remainder of the repair work being performed by other workers, (automobile tester; brakeman, automobile; carburetor man; motor analyst; tire repairman; wheel alignment mechanic.)

AUTOMOBILE MECHANIC, BENCH (auto. ser.) bench motorman. Works mostly at a bench while repairing and overhauling automobile motors.

AUTOMOBILE MECHANIC, MOTOR (auto. ser.) automobile motorman; engine mechanic; motor mechanic. Repairs and overhauls only the motors of automobiles or trucks. This job is usually found in garage attached to an industrial plant employing a large fleet of automobiles and trucks.

Items Worked on in Plant Surveyed: Passenger automobile used for owner's private pleasure and convenience; passenger cars used for official business; route salesmen's trucks (light delivery).

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

AUTOMOBILE SERVICING

GENERAL MECHANIC (Cont'd)2. Usual Operator:a. Sex: Male

b. General Characteristics: In this industry you will find any size of worker acceptable, with small men having the advantage in certain operations of the work, such as electrical repair, for which the mechanic has to crawl under the dashboard, or large men may be preferred where there is heavy lifting such as the mounting and dismounting of truck wheels and tires. Educational requirements are very lax, although in most cases the employer prefers at least a high school education or vocational school training. Auto mechanics seem to rely heavily on general aptitude and experience. Many positions in this industry require a high degree of resourcefulness on the part of the mechanic. Mechanics in this industry should be alert, dependable, careful and conscientious, whether working direct for the car owner or for an employer.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, crawling, kneeling, reaching, lifting, carrying, pushing, pulling, handling, fingering, feeling, talking, hearing, color vision.

b. Working Conditions: Inside, outside, cold, dry, wet, dusty, dirty, odors, noisy, adequate lighting, adequate ventilation, mechanical hazards, moving objects, cramped quarters, exposure to burns, working with others, working around others, working alone.

c. Skill Required: The worker who can perform all the functions required of a general automobile repair man is truly a skilled mechanic. The diagnosing of automobile ailments, especially engine trouble, requires a real understanding of the underlying principles of the internal combustion engine; the diagnosing of running gear and drive system requires a good understanding of mechanical apparatus, while the servicing and adjustment of automatic transmissions require special training. The all-around mechanic may be called upon to decide which one of several ways of curing a trouble is in keeping with

AUTO OBILE SERVICING

GENERAL MECHANIC (Cont'd)

the value of the car itself and the service demanded of it by the owner. Certain extra skills are required of two specialists, such as the testing man, service salesman, tune-up man, and auto electrician. A high degree of manipulative skill and speed is required of the operator in order to meet the production schedule set forth in the manual published by the manufacturer of the car. However, this manual also includes a carefully engineered and tested routine for the performance of the specific operation.

4. Details of Physical Activities: A limited amount of walking is required around the vehicle being worked on, from the vehicle to the bench, and occasionally to the Parts Room, a distance of from 50 to 200 feet. Stands a large part of the working period at the bench or alongside the car, stooping and reaching over parts of it to get to the engine and other equipment; turns, stoops, crouches or kneels to work on various parts, such as wheels and brakes. May have to reach over and into parts of car in order to remove or replace and tighten up parts; pushes and pulls, wrenches and twists screwdrivers to tighten or loosen the screws or bolts in the process of removing or replacing parts or making adjustments. Occasionally lies on his back on a creeper or scooter or lies directly on the floor and crawls on his back and reaches up with tools to work on the under side of the car. May lift and carry parts weighing as much as 100 lbs. to install or remove them. May pull on chain hoist to raise or lower parts that are too heavy for direct lifting. Handles parts to remove them or put them back into the proper position which may be difficult to reach. Feels, feels and manipulates bolts, nuts, and screws, in order to insert and tighten them. Bolts or nuts are sometimes so located as to require exceptionally good finger manipulation. Frequently determines by feel whether threads are properly started and bolts and screws uniformly tightened. May tell by feel whether gears are running properly and bearing correctly adjusted. Frequently has to talk with foreman or car owner in order to ascertain symptoms of trouble or work to be done on the vehicle. May tell by hearing and feeling whether engine is properly adjusted. If special tune-up equipment is used, worker may be required to read electric meters and gages. May find it convenient to tell by colored tracer in electric wires, the proper connections to electrical parts being replaced.

ADDITIONAL JOBS LISTED IN PART IV, GENERAL COVERAGE SERIES

AUTOMOBILE SERVICING

GENERAL MECHANIC (Cont'd)

5. Details of Working Conditions: Works outside in emergency situations when cars are stalled on the road or on other equipment which cannot be brought into the shop. Works inside most of the time in buildings ranging from old ones, which are poorly heated and inadequately ventilated, up to modern factory type building kept warm and clean, with specially designed ventilation, adequate for the removal of battery acid, fumes, and the exhaust gases from the car. Most of the work is dirty from the carbon products of combustion, broken down lubricating oil, and road dirt on the under side of the car when it is brought in. Work area is only slightly noisy except when it is close to the body repair department. Odors will be very slight where there is an adequate ventilating system. Carbonmonoxide fumes coming from poorly adjusted engines may become excessive in buildings where the ventilation is inadequate, resulting in poor health conditions for the worker. Working conditions are dry, except for outside emergency calls during inclement weather. Lighting is usually good. Extension cords with guarded light bulbs are available for use in dark corners and under the car. The location of the cars in the shop usually leave adequate room for other mechanics to work without being in each other's way. Mechanical hazards come from the slipping of wrenches and the dropping of hard objects. The general mechanic may work alone in his own garage or in a particular assigned "stall" in the larger shop; he may work around others in a large work area, or he may work with a helper or other mechanic in installing or removing heavy parts.
6. Hazards: There are few hazards peculiar to this industry. The most frequent injuries are bruised, cut, or pinched fingers and hands, due to the slipping of wrenches, screwdrivers and other tools, or parts of the car. Foot injuries are sometimes caused by tools or work parts falling off the work bench. Serious straining of the back or muscles may result from too heavy or awkward lifting when taking off or replacing heavy parts or units, such as clutch or transmission. Other accidents may be caused by slippery spots or misplaced objects on the floor. As a matter of precaution, the mechanic should use only such wrenches, screwdrivers, and other tools that are in good condition. He should also inspect the nut or screw head to determine whether the driving edges and corners are worn out so that

AUTOMOBILE SERVICING

GENERAL MECHANICS (Cont'd)

he can govern his use of tools accordingly. In the case of a skin abrasion or cut, first-aid treatment should be prompt, especially the disinfecting of the wound. When he is working under a car, dirt may fall in the mechanic's face and if a particle of it should get into his eye, it should be promptly washed out. Skin irritations may result from the action of cleaning solvents used in washing parts, and it may be necessary for the worker to eventually consult a Dermatologist in order to clear up this trouble.

7. Sequence of Steps in Position in Plant Surveyed: There are two types of small automobile repair shops in which the totally blind mechanic has been known to operate successfully, doing practically every kind of mechanical overhaul, repair, and adjustment to the mechanism of the car, namely, (1) the shop which draws its business from the general cross section of car owners. A capable blind worker may be fitted into such an organization without too much difficulty, on account of the inherent flexibility of the small shop; (2) in another instance the blind mechanic may be comparatively easily fitted into a 3 or 4 man shop operated by a company to take care of its own cars and trucks. In this case, better advance planning of overhaul work can be made than in the shop doing work for the general public, and the flexibility of the blind mechanic need not be so great.

The following steps show the operation of a shop serving the general public:

- a. Upon his arrival with his car at the shop, the customer talks with the foreman (may be the shop owner) about the car trouble and things to be done to correct it. The foreman may give him an estimate of the cost and the time required to do the work. If the customer has previously had favorable experience with the work done by the blind mechanic, he may talk with him first, and the two then consult with the foreman about the final decision.
- b. If the blind mechanic (known to the customer or not) is to do the job, the foreman calls him over, introduces him to the customer, and briefly outlines the trouble and the work the owner wishes done on the car. The foreman should be

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

AUTOMOBILE SERVICING

GENERAL MECHANIC (Cont'd)

certain at this point that the customer is satisfied to have the blind mechanic do the job.

- c. The blind mechanic then takes charge, having the owner or a helper move the car inside to the proper "stall" in the work area. (The blind mechanic is usually given the stall closest to the tool rack and parts boom.) After the customer has left, the foreman may discuss in more detail with the mechanic the procedure to be followed in general for the work to be done, agreeing upon points where sighted inspection is to be given by the foreman or other worker, and also what portions of the work are to be re-assigned to one of the sighted mechanics or sent to an outside shop. (As time goes on and experience accumulates it will become generally known what repair operations the blind mechanic will farm out to others.)
- d. The mechanic then proceeds to dismantle the parts that should be removed, cleaning and inspecting them to determine which are to be repaired, readjusted or replaced. He watches at certain points in particular for indications of what has caused the trouble.
- e. At an agreed time in the operation he calls for the foreman to get his approval for the installing of new parts and the repairing of others. The mechanic may make a record of the clearances found between the cylinders and pistons, crank shaft and bearings and other parts. As the foreman checks over with the mechanic the condition of the parts, he may write out an order for new ones to be secured from the stock room and/or sent for from the supply houses. In other instances, a blind mechanic may type out this list himself and draw the parts from the stock room.
- f. The mechanic installs the repaired or new parts, making the proper adjustments where required. He may call for the assistance of a helper or another mechanic as needed, especially with the handling of heavy units. According to previous agreement or established custom in the shop, the blind mechanic may call on the foreman, other mechanic, or helper to assist with the needed visual inspection of certain items, such as valves, just before they are installed. Measurements such as clearances, may be checked with micrometers, feeler gages, or other special devices which the blind mechanic may

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

AUTOMOBILE SERVICING

GENERAL MECHANIC (Cont'd)

have developed for his own use. It is usually an established shop custom to have the helper or other mechanic help to move into position heavy parts, such as motors, clutches, transmissions and rear-ends. NOTE: It is important that the blind worker in turn help the other mechanics whenever they have a two-man job.

- g. A blind mechanic will run the engine and drive system in the shop as much as possible (jacking up the rear wheels and allowing the transmission clutch and differential to be tested.) The adjustment of many of these parts can be checked by feel and sound. The front wheel alignment is made as close as possible with the toe-in gage and steel square. Brakes are set as evenly as possible by feel, then, as is the custom in the small shop, the car is taken over to another garage which has the equipment for checking these settings while the car is in motion.
- h. The blind mechanic checks with the foreman the final condition of the car and the work that has been done. The latter may go with him on a road check, or a helper may drive for him.
- i. When the customer comes in to get his car, the blind mechanic discusses with him the conditions found, the repair work done, and the resulting improvement in performance. He should explain thoroughly to the customer any precautions and care required, such as would be necessary in the case of a rebuilt motor, which must be treated like a new one. He may recommend to the customer that the machine should be brought back at a certain mileage for final check-up and readjustment.
- j. After the customer has discussed and is satisfied with the job, his signature is secured on the job order, and it is turned over to the foreman or cashier for financial settlement with the customer.

Several instances are known where a totally blind person has been employed as a general automotive mechanic and has been put in charge of the company's garage, being responsible for the maintenance and repair of a fleet of trucks and company passenger cars. Minor incidental repairs and adjustments, such as changing spark plugs and tightening brakes,

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

AUTOMOBILE SERVICING

GENERAL MECHANIC (Cont'd)

have to be taken care of promptly and during the time the trucks are in the garage between runs. The long-range operation, such as engine rebuilding or complete overhauling of the brake system, can be planned for in advance. The garage staff serves gasoline and oil to the trucks, and checks and changes tires. They also wash cars and trucks.

The following steps indicate the procedure generally followed in handling the maintenance work of the garage:

1. When the driver notes small troubles developing, he talks with the blind mechanic when he returns to the garage. The driver may take the mechanic with him for a short run if it is necessary to properly diagnose the trouble. An agreement is reached as to the time when the necessary work can be done. Usually this is between trips. If the driver comes in at "off hours" when the mechanic is not available, he leaves a note indicating the service needed.
2. Card files are kept on each vehicle showing the mileage on tires and maintenance operation. "Call Up" cards indicate the appropriate time when a major overhaul is to be expected. When a mechanic believes such an overhaul should be made, he checks with the driver and route manager and they schedule when the truck can be taken out of service for the length of time necessary to do the job.
3. When the truck comes in for a major overhaul, the helper, working under the direction of or with the blind mechanic, dismantles the parts to be worked on. When the dismantled parts have been cleaned, the mechanic inspects them and decides on the repairs and replacements which are necessary.
4. The helper, under the direction of the mechanic, makes out a requisition for parts and materials and goes to the supply houses for them. Major units such as generators, clutches, transmissions, and brake-cylinders, may be overhauled in the garage or replacement units purchased, depending upon the condition of the parts and the time available.

AUTOMOTILE SERVICING

GENERAL MECHANIC (Cont'd)

5. The mechanic and helper make the repairs and reassemble the various parts of the vehicle. The mechanic makes the necessary adjustment. The car or truck, if it is required, is sent to an outside shop, where special equipment is used to assure the best front wheel alignment and brake adjustment, after which the road test may be made by the mechanic and helper, also the mechanic may go on a short road run with the regular driver of the truck. He also personally instructs the driver regarding any precautions that should be taken to assure the proper "break in" of new parts.
6. The garage attendant and car washer are available for moving vehicles around and in and out of the garage or into the repair shop.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: A list of equipment to be found in a general automotive repair shop will include items such as the following:

- (1) Hand Tools: Speed wrenches and other sockets; spanner and other special purpose wrenches; punches; cold chisels; screw drivers; pliers; machinist and soft-headed hammers; files; drill bits; hand and electric power portable drills; valve tools, and gages.
- (2) Specialized Power Tools: Power-driven special machines include valve facing and stem grinding machines; brake shoe facing machine, used for grinding the face of new brake lining so that it is perfectly smooth and contoured to the same circle as the face of the drum with which it is to be used, with adjustment for diameters from 9 to 16 inches, plus necessary compensation for over-size brake drum refacing machine for honing drums up to 16 inch diameter, with an assortment of fittings to duplicate any type of mounting; internal honing machine, used for honing wrist pin bosses; king pin, connecting rod, and other bushings to accurate size with respect to the other parts with which they are to be used.

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GENERAL COVERAGE (Cont'd)

- (3) Miscellaneous Equipment and Tools: Include long-handled hydraulic floor jack; roller type jack for moving cars; a single post hydro-pneumatic car hoist; floor scooters; drill press, one-half inch capacity; overhead frame and chain-block hoist; wheel pullers, and wheel aligning gage.
- b. Set-up and Maintenance: Methods and skill required to set up machines similar to the following:
- (1) Valve Facing and Stem Grinding Machine: Each mechanic in turn sets this machine for the particular valves on which he is working. The face angle is set by swinging the chuck mounting around until the stationary reference groove registers with the scale marking which indicates the angle desired, such as 30 or 45 degrees. It is then locked in this position. With the valve head moved up so that it is in front of the grinding wheel but not touching it, the machine is set in motion. The cross-feed is turned to move the valve toward the wheel until a grinding noise is heard. The left-hand control is turned first one way and then another to move the valve back and forth across the face of the wheel. With each pass, the cross-feed is turned a little to move the valve closer, taking an additional cut until a steady grinding noise is heard. If the valves are to be ground off at the bottom end of the stem for length, each in turn is placed in the right hand chuck and moved up until the bottom of the stem just touches the second grinding wheel. The machine is then started up and a minimum finish cut is taken to give a true reference surface on the end of the valve stem. The valve is set in its respective position in the engine block. The clearance is measured by inserting feeler gages between the stem and the tappet. The difference between this reading and the required clearance is the amount of material that must be ground off from the bottom end of the valve stem. The stem is then replaced in the chuck and the required amount is ground off. Occasionally, it will be necessary to dress the faces of the grinding wheels. This is usually done by the foreman, and can be done without sight.

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- (2) Brake Shoe Facing Machine: The brake shoe with new lining on it is placed in the holding fixture, with the ends of the brake lining equally distant to the right and to the left of the positioning pins. The holding clamp is then tightened down. To set the machine for the nominal diameter drum, put the brake shoe at the middle of swing; pull out the pin at the left of the cross slide; push the assembly away until the brake shoe touches the grinding drum; pull the cross slide forward until the latch pin drops into the hole, completing the setting for the right nominal diameter, and set micrometer adjustment on the cross slide for the number of thousandths of an inch over-sized diameter (if any) of the brake drum with which the shoe is to be used.

By means of the operating handle, swing the shoe back and forth across the face of the drum, twisting the handle until the shoe just clears the abrasive drum; turn on the power, swing the shoe back and forth, and at the same time, twist the operating handle to increase the depth of the cut until a steady grinding noise is heard. At this point the high spots will have been removed and the lining contoured to fit the particular drum with which it is to work.

The abrasive covering for the grinding drum must be replaced occasionally. This is usually done by the foreman and can be done without the use of sight. The scale markings on this machine can be read by use of the fingernail.

- (3) Brake Drum Refacing Machine: The brake drum with hub attached is slipped over the head shaft, and followed by a tapered sleeve and a nut which, when tightened, moves the two tapered surfaces against the two bearing faces in the hub, holding it rigidly in the exact plane of rotation. If the drum comes without a hub, a dummy hub is put in position and the drum is mounted on its flange by the stud bolts and nuts provided for that purpose. With the machine at rest, the boring bar is moved in until the point of the cutting tool is opposite the unworn portion of the original surface. The

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AUTOMATIC SHAPING

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(Cont'd)

cross feed, for setting the depth of cut, is turned to move the cutting tool forward until the point contacts the unworn surface. The boring bar is then moved out clear of the drum and the tool set over for the depth of cut desired, such as five to fifteen thousandths of an inch. The machine is then set in motion, the cutting tool moved up to the drum, and the power feed put in, which continues the cutting action at a uniform speed across the face of the drum. When the tool has advanced all the way across the worn surface, the feed is stopped and the boring bar moved out of the drum. The depth of cut is reset and the cutting action repeated until the turning noise is steady, indicating that the entire surface is turned to the true finish. The first cuts are made with the fast feed, but the last cut, a very light one, is made with a slow feed to get a good surface. When the cutting tool tip becomes dull, it can be removed with a screwdriver and replaced with a sharp one.

- (4) Internal Honing Machine: This machine has an expanding hone similar to the action of an expanding reamer. A honing stone is mounted on each of two opposite sides of a long revolving spindle. After the hone is set for a desired diameter, it can be temporarily collapsed to permit the work to be easily slipped over. The collapsing and re-expanding is operated by a foot lever which also stops and starts the rotation of the hone. Different hones can be installed for different ranges of diameter. A sample wrist pin, king pin, or other part to which the work is to be fitted, is mounted on the back of the machine to the right, in such a way that the piece being honed can be quickly tried over it. On the left side, at the back, a bristle brush is mounted in such a way that the piece which has been honed can be run up and down on it to brush out pieces of grit before checking on the sample pin. A dial, for varying the working diameter of the hone, is also mounted on the back of the machine. When starting to work on a particular piece, slip it over the spindle, hold onto it and depress the foot pedal to put the machine into motion. If the work is loose on the hone, the setting dial is turned clockwise until a drag is felt. The work is moved back and

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AUTOMOBILE SERVICING

GENERAL MECHANIC (Contd.)

forth lengthwise of the rotating spindle until the drag begins to decrease. It is then taken off the spindle, cleaned on the brush, and tried onto the sample pin. If it is too tight on this pin, continue the honing process until the piece just barely starts on the sample pin when good hand pressure is exerted. Then set the dial clockwise for the number of graduations representing the clearance desired between the pin and the bushing. Continue the honing operation until the pin begins to ride free on the spindle. At this point the work should have the desired diameter. During the honing process, cutting liquid should be kept running onto the work. The dial for setting the diameter has embossed graduations which can be read by the finger nail.

- c. Modifications: There are no significant modifications required on these machines for operation without the use of sight. For some blind workers, it might be necessary to put on several Braille type dots to mark the reference line and major graduations of the dial or scale. On many machines the original engraved markings can be counted with the fingernail, small screwdriver, or a stylus.

9. Equipment Variations Which May Be Found in Other Plants:

There are too many makes and variations of these special machines to attempt to list them here. Some of them are comparatively inexpensive and, while slow in action, they are adequate for the small shop which needs to be in a position to do some of this work occasionally. Other machines are higher in price, more accurate, do three or four units at a time, and some are practically automatic in their action. Nearly all of the specialized power driven equipment can be recognized as members of one or another group of power driven tools, so that the blind worker who has had training on the six basic power tools * can easily comprehend the schematic picture of these special machines. This will help him to quickly learn how to operate them. Often the decision of which type of machine to buy, if any, depends

* Machine operations (Metal working power tools, GC-5)

AUTOMOBILE SERVICING

GENERAL MECHANIC (Cont'd)

upon the service available from automotive supply houses and reliable reconditioning shops. Some repair shops will have equipment for re-boring and honing cylinders, turning pistons, dynamic testing of brakes and front wheel alignment, and complex analyzers for diagnosing trouble and checking adjustments of the carburetor and ignition system.

10. Usual Pre-employment Training: A worker's qualification, for employment as a general mechanic, usually arises from an extensive, successful experience in this type of work. He may have been with one firm or in other equivalent shops, working as a helper or apprentice, receiving instructions from the shop foreman as either formal or informal on-the-job training. He has received promotion as he demonstrated his ability in the employer's shop. He may have supplemented on-the-job training with vocational trade school classes, either part-time while working, or on a full-time basis before entering paid employment. Prior to formal employment, the young worker may have gathered a lot of experience and some skill working on his own car and those belonging to friends. (This early experience "in his own backyard" is often highly recommended as a good way for a blind person to start learning automobile repairing and to make his first adjustments to the problems of being a blind automobile mechanic.)
11. Usual Training Procedure on the Job: The general mechanic receives on-the-job training in one or more of the following ways:
 - a. Through explanation, from the foreman, of how to do particular operations, arising from new designs of the mechanism of the car or the adoption of new specialized shop equipment.
 - b. The foreman may, following his attendance at a manufacturer's special school dealing with particular problems or new car features, conduct formal classes for all the mechanics in his shop to relay the information to them.
 - c. The mechanic himself is sometimes sent to the factory for a short course on special problems, such as those pertaining to new automatic transmissions or ignition systems. This training by the manufacturer may be

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organized on a regional basis designed to make highly skilled specialists out of the general mechanics on particular operations, such as testing and diagnosing. Courses of this type are usually, but not exclusively, limited to employees of dealers selling a particular make of car.

12. Any Training Deviations Suggested for the Blind: The training of a blind worker to be an automotive repair mechanic may deviate from that of a sighted worker in some of the following ways:
- a. In many cases and for many operations, the blind worker will have to develop and adopt alternative methods of performance, using alternative methods of perception.
 - b. In some cases, it may take a longer period of training to reach a given level of skill, because the blind mechanic misses a lot of incidental information which the sighted person picks up from the adjacent worker at a glance. Sometimes the alternative method, used by the blind person, is more time consuming at the beginning.
 - c. Basic knowledge of the automobile engine and chassis and ways to work on it are frequently learned by blind persons from working on an old motor car, or car of his own, under the guidance of a sighted, friendly mechanic who is imaginative, resourceful, and practical.
 - d. A vocational school shop, with the proper type of instructor, presents an excellent opportunity for the prospective blind automobile mechanic to develop methods and acquire speed and skill in working in partnership with the sighted worker. The instructor, as well as the blind trainee, must always keep in mind that he is preparing for performances on a competitive basis, both as to time and quality of work.
13. Production:
- a. Full: Each day the combination of jobs is so variable that many shops do not attempt to set figures for

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GENERAL MECHANIC (Cont'd)

normal production. Others may go by the factory prepared manual which gives both the sequence of steps and the average time to be allowed for the performance of each operation, such as replacing the pinion gear, rebuilding clutch, repacking water pump, or replacing and adjusting spark plugs. In the case of shops working on an hourly basis, the foreman usually is able to make a close appraisal of the time it should take the mechanic to do the job and he will be judged accordingly. The customer is quoted an estimate on this basis but is billed on the actual time consumed. In turn the customer may relay to the foreman the quotation given him by a competing shop. Some shops pay a small weekly wage, plus a percentage on the work accomplished, as calculated from the time schedule presented in the manufacturer's manual. This appears to be very advantageous from the blind mechanic's standpoint, because it eliminates the question as to whether or not his speed is what it should be. In other words, he is paid the same amount for any job as is paid to the sighted worker. A comparison, between the time taken by the blind mechanic and the figure given in the manual, can be taken as an indication of which jobs he can do most efficiently, and the work should then be assigned accordingly by the foreman.

b. Time to Reach Normal Efficiency:

The time required for a blind mechanic to reach an acceptable minimum speed of production, depends first upon his aptitude and ability, and second on the type of training he receives. Information obtained from vocational counselors and instructors, qualified observers, and experienced blind mechanics, indicate that it may require three to four years for the blind person to reach the acceptable level of production, and three or four years more will be required for him to reach his maximum level. The reports also indicate that a great deal of importance is attached to his producing uniformly high quality, dependable work. Once the reputation for high quality work is established, the foreman and customer are not so critical of the time element.

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GENERAL MECHANIC (Cont'd)

14. Interrelation with Preceding and Succeeding Jobs: Many car owners bring a job to a certain repair shop for the first time upon the recommendation of another customer, or because of the general reputation of the shop. The quality of each job done will have a bearing as to whether or not the customer will come back for more work and recommend the shop to a friend, also whether or not the same mechanic will be asked for in the future. When one worker specializes on certain operations, such as tuning-up or wheel alignment, the quality of his work will be reflected in the performance of the car.
15. Teaming with Other Workers: On operations requiring two men, the general mechanic usually has a helper or apprentice to work with him. Two general mechanics may work simultaneously on different phases of the repair job in order to get the work out to meet a dead line. In some shops the foreman inspects the work at certain stages, whether the mechanic is blind or sighted. In other cases, where visual inspection is essential, a sighted mechanic must take time to do this for the blind worker. In such a case, the second man punches his time card "out" and "in" to show the amount of time taken for this inspection, unless it can be done very quickly. In the latter case both workers may "trade time." When the rest of the mechanics get used to having a blind worker in the shop, they will be able to give him a little assistance without losing time on their own work. For instance, if the blind worker should call out that he needed a special wrench, the man working on the neighboring car could probably determine at a glance at the tool rack whether the equipment in question was there or not. He also might be able to tell the blind mechanic that the wrench was at a certain other car, and with a word or two indicate whether the other mechanic was still using it. With a blind mechanic in the shop there often is a stiffening of the regulations regarding the returning of tools to the rack, thus saving time for all the mechanics and improving the condition of the shop.
16. Modification, Deviation, Special Tools for the Blind: When road testing is needed, someone must go with the blind mechanic to do the driving. This may be either a helper or the foreman. Sometimes an adjustment is made on the mechanic's time card to compensate for this extra help. However, in

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other cases it may be the general practice in the shop for the foreman to do this for all cars. With micrometers and other measuring gages, special calibrations may be necessary. In the case of some of the equipment, the filing of notches or adding a few Braille type dots will be sufficient. The blind mechanic will usually have his own micrometers. If he needs to read a dial indicating gage where the pointer is behind a glass face, it will be necessary to remove the glass, substituting a piece of clear plastic, hinged in such a way that it can be swung up out of the way for contact reading, then allowed to drop down in front of the gage for protection.

17. Sight Requirements and Conditions:

- a. Vision Required for the Job: Probably about three-quarters of work in a small shop can be done without the use of sight. If the personalities of the blind mechanic, the foreman, sighted workers, and the shop owner are congenial, it will be comparatively easy to make assignments in such a way that the blind mechanic can be kept busy on those operations, which he can do most advantageously, without throwing extra burdens on the rest of the force.

b. Conditions affecting Suitability of a Particular Job:(1) For the Totally Blind:

- (a) The size of the shop: Not over 5 or 6 mechanics.
- (b) Garage attendants available to move the car in the shop and to drive on road tests.
- (c) The size of the community to be such that the mechanic and the quality of his work can become very well known.
- (d) The personality of the shop owner.
- (e) Mechanics paid on a basis at least closely approaching piece work.

(2) For the Partially Sighted: The same conditions apply as for the totally blind in varying degrees, according to the character of the residual vision

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GENERAL MECHANIC (Cont'd)

of the particular mechanic; for instance, he might be able to read short notes or job order instructions, or be able to move cars around on the premises.

18. Avoid the Following Conditions: Where (a) the mechanic himself must take the information of what to do with a particular car from the work sheet which has been filled out by a floor man; (b) the mechanic must write out his own requisition for parts, and travel conditions to and from the stockroom are bad; (c) the foreman does not make it a habit to check the old parts before replacements are approved; (d) the work is not inspected by the foreman at certain stages, such as when all valves have been ground; (e) there is no floor man or helper available to move cars in and out of the shop area; (f) the mechanic must do his road testing alone.
19. Other Jobs Often Combined for Full-Time Employment: In small shops affected by seasonal conditions, the mechanic may be called upon to wait on customers for gas and oil, grease cars, change tires, and in some cases to go out on the hoist truck to give road repair service to a stalled car.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Employment opportunities for a totally blind person to work as a general mechanic are best in (a) five to six man shop located in small communities or shopping areas where customers may become acquainted with his accomplishments, so that his visual deficiency is not a hindrance in securing and satisfying customers; (b) corporations and plants operating a fleet of cars and trucks in sufficient number to require the continued service of two or more men in their maintenance garage; (c) passenger bus and truck lines, both local and cross-country.

HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRY SERIES

Category SI-9

METER REPAIR

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

METER REPAIR

General Information Sheet

Character of Industry: The Meter Repair Industry is Nation wide and should not be confused with the manufacture of meters. Although there is a wide variety of meters in use in this country, this category is primarily concerned with repairing and servicing meters used by utility companies to measure the quantity of water, gas, and electricity consumed by their customers. This category will also include parking meters, used by municipalities to control the parking of motor vehicles and as an additional source of revenue, and speedometers used to measure the speed and distance traveled by motor vehicles. Other descriptions of meter repair jobs will be added as jobs are tried, tested, and proven as practical areas of employment for blind workers.

Most utility companies maintain their own meter repair departments in which they employ from two to forty people. The pay scale is comparable to the wage scale in similar industrial jobs. Employees work an average of forty hours per week. Fringe benefits compare favorably with those of industry across the country. Most utility companies have a rotating policy on meter repair; that is, in addition to the repairing of meters that break down in service, all meters are removed from service every ten years and taken into the shop for repair and rebuilding before returning them to service. Thus the customer is assured of an accurate measurement of services.

Utility companies have, as a rule, three classifications of metermen: (1) meter readers are men who read the meters on location and record their findings for the billing department; (2) testers and installers test meters on location for trouble, remove them and install a working meter as a replacement of the bad meter; and (3) meter repairmen work in the shop and disassemble, clean, repair, and reassemble meters before they are returned to service.

In addition to the meter department, utility companies have four other operating departments. They are clerical and billing, laboratory, production and service, and appliance repair. This pattern of organization is generally standard throughout the country in both public and privately owned companies.

For the purposes of this category, the two departments which present greater possibilities of employment for blind workers are the meter repair and appliance repair departments.

General Information Sheet (Contd.)

Most utility companies repair and service appliances as a convenience to their customers. This is particularly true of companies dispensing electricity. These companies have two classifications of repairmen: (1) "Outside" or "on-site" repairmen who service and repair electrical equipment without removing it to the shop, such as cookstoves, water heaters, air conditioners, etc.; (2) Small appliance repairmen work in the shop exclusively and repair such items as toasters, coffee makers, irons, fans, waffle irons, etc.

Meter repair departments are generally set up by using one of two production methods: (1) the production line method, and (2) the job shop method. The production line method has the total operation broken down into two separate and specific jobs. In the job shop method, the employee or mechanic does the total job of repairing a meter and is classified as a skilled mechanic. Although there are a number of meter departments in the country that still use the job shop method, there is a definite trend in the industry toward the adoption of the production line method, in order to reduce costs and to enable the companies to recruit workers more easily.

In the electrical field, there is a great variety of meters used, such as volt meters, amp. meters, ohm meters, polyphase and demand meters, single phase watt-hour meters, etc. The single phase watt-hour meter is most commonly used to measure current consumed by the home owner. The repair on this meter is relatively simple and in most instances the production line method is used, with some few exceptions, where the job shop method is still the most practical. However, those shops now using the job shop method for the repairing of single phase watt-hour meters will eventually convert to the production line method, in order to reduce costs and to be able to recruit greater quantities of labor.

Natural gas distribution systems use two kinds of meters in measuring gas. The "wet" meter is used to measure gas received through the pipeline by the distribution system. The "dry" meter is a small unit and is used in measuring the quantity of gas consumed by the individual customer. Both the production line and job shop methods are used in the repair of this meter.

Water distribution systems use several types of meters in measuring the quantity, velocity, pressure, and depth of water. The "current", either nutating or oscillating disk type meter, is used primarily to measure the quantity of water consumed by the individual customer. The increasing shortage of water has greatly increased the necessity for more accurate measurement

General Information Sheet (Contd.)

of water consumption. Consequently, there has been a considerable expansion of the water meter repair industry with correspondingly greater demand for trained personnel and an improvement in wage scales and working conditions. Although some water meter repair departments still adhere to the job shop method of operation, there is a definite trend toward the more efficient production line method.

The newest member of the meter family is the parking meter which is used by almost every organized community in the country to control the parking of motor vehicles and as a source of revenue. At first, the purchasers of parking meters returned them to the manufacturer for repair when it was needed. However, it soon became apparent that it would be more economical to establish their own meter repair departments. Parking meter repair departments may be found in the police, traffic control, and in the street maintenance departments. The only part of the meter that is not repaired locally is the clock mechanism. It is returned to the manufacturer for service. In communities of less than 50,000 population, parking meter repair is usually contracted to a privately owned repair shop. These small shops usually contract with several communities in order to have full-time employment.

The speedometer is a combination instrument that measures the speed and distance traveled by motor vehicles. Since the repair and service on this instrument is highly specialized, and since there are no automobile dealerships--except the very large dealerships--that employ specialists in this type of work, speedometer repair is usually referred to the privately owned shop. The shops are usually small and employ from two to thirty people.

Distribution of Industry: The repairing and servicing of meters is Nation wide. However, utility companies (this is particularly true of gas and electric companies) which cover large areas usually centralize their repair operations. For example, the Virginia Electric Power Company covers the entire State of Virginia and brings its meters into their central repair shop in Richmond.

Type of Worker Usually Employed: Since jobs in meter repair departments are quite often used as entry jobs and as training, preparatory to promotion to better jobs, men of trainable age are usually hired for meter repair. However, some companies transfer older workers from other departments to meter repair units because the

General Information Sheet (Contd.)

work is light and more sedentary than is ordinarily found in other service departments of the company.

Conditions: Inside, dry, well-lighted, well-ventilated, normal shop floors, free from floating dust particles and strong fumes and odors, day-time work, 40-hour week.

Physical Demands, Health Conditions, and Hazards of the Industry: Operators of meter repair departments are required to observe and follow safety rules and regulations. The work areas are well-ventilated and the aisles are kept free of materials. Health conditions are good. Hazards in the industry are in working with compressed gases under high pressure and high voltage electricity used in the testing of meters.

General Coverage Jobs Pertinent: Machine operations (metal working power tools) GC-5 (footnote, drill press, sensitive type, and arbor press, #1.); assembly of small parts, GC-8; inspection of small parts, GC-9; and benchwork, metal, GC-10.

Combination Jobs: In the larger meter repair departments, each job operation is a full-time process. However, in the smaller meter repair departments there is usually a greater degree of diversity of job operations. Consequently, workers have to be able to perform more than one job in order to have full-time work. In plants where diversification is necessary to assure an employee full-time work, the following job combinations may be found: disassembling, cleaning (degreasing) machine operation; assembling of valves, drill press, and arbor press operations. Another factor in the diversification of jobs is to reduce tedium.

Jobs to be Avoided Although Seemingly Suitable: Lath and milling machine operations because the operators are required to work from blue prints and job specifications; inspection and testing because of the vision required; and because water and gas under high pressure and high voltage electricity are used in testing.

METER REPAIR

ELECTRIC-METER REPAIRMAN1. Name Used for Position in Plant Surveyed: Meter AssemblerD.O.T. Title: Electric-meter repairman (light, heat, and power)Code: 5-83.456Alternate Titles: Meter assembler, meter tester.

D.O.T. Definition: Inspects, adjusts, and repairs electric meters used for recording electric current consumption; disassembles defective meters, using screw drivers, wrenches, and pliers; examines various parts of meter for wear and detects warped or bent parts by soaking them in a carbon tetrachloride solution; removes dirt from other parts, using brushes, sand paper, and soap and water. Reassembles meters, using new or repaired parts; may test meter for accuracy (electric meter tester) or corrections of assembly and dielectric strength, using testing apparatus; may repair clock-like registering device of demand meters (demand meter repairmen), but does not repair clocks in meters (demand equipment repairman).

2. Usual Operator:a. Sex: Male

B. General Characteristics: Good health, average intelligence with mechanical aptitude, 18 years of age or older, trainable, good manual and finger dexterity, ability to get along with others and to take supervision.

3. Physical Demands:

a. Activities: Standing, stooping, bending, walking, lifting, carrying, fingering, reaching, and handling.

b. Working Conditions: Inside, dry, well-lighted, well-ventilated; normal shop noises; free from dust and other foreign particles; working with others.

c. Skills Required: Ability to handle small tools and to exercise good judgment.

4. Details of Physical Activities: Worker must stand or sit in slightly bent position for long periods of time; lifts meter cases (average weight, 3 to 4 pounds) from floor trucks and places them on workbench; walks to end of work area and carries finished meter and places it on the rack; fingers parts for

METER REPAIR

ELECTRIC-METER REPAIRMAN (Contd.)

identification and matching with other parts; reaches to back of workbench for parts and tools; handles small tools.

5. Details of Working Conditions: The meter repair shop is inside and the humidity is well controlled. The work area is well-lighted and special lights are installed over individual workbenches. Ventilation is good and, in many places, air-conditioning has been installed not only to control temperature but also to keep dust and other foreign particles to a minimum.
6. Hazards: Work areas are well-defined and aisles are kept free of materials. Employees are required to observe normal safety rules and regulations. High voltage electricity used in testing meters is the major hazard of this area.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Worker removes partially assembled meter from rack at the end of the workbench and places it on workbench with coils toward the front.
 - b. Removes register from parts bin at the rear of the bench and places it on the meter frame meshing the lower cog with the one on the worm shaft.
 - c. Screws register to the frame with 2 screws using a small screw driver.
 - d. Places glass cover on meter frame and fastens it in place by turning it until it locks.
 - e. Secures the lock with a wire seal.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Workbenches, hand tools, soldering irons, cleaning machine, floor trucks, parts storage bins, bench lathes, milling machine, drill press, grinders, buffer, and meter-testing equipment.
 - b. Setup and Maintenance: Each machine operator is required to maintain and to make all setups on his machine. Bench workers keep the work area clean and parts are delivered to them by floor trucks operated by porters. Testing equipment operators maintain their own equipment.

METER REPAIR

ELECTRIC-METER REPAIRMAN (Contd.)

9. Equipment Variations Which May Be Found in Other Plants: None.
10. Usual Pre-employment Training: Since a person can be trained to assemble electric meters during the normal break-in period, pre-employment training is not required. However, machine operators are required to be journeymen machinists prior to their employment.
11. Usual Training Procedure on the Job: Training for meter assembler is usually done on the job by the department supervisor during the normal break-in period (30 to 90 days).
12. Any Training Deviations Suggested for the Blind: Since the average break-in period is 60 days, it is suggested that a blind worker be given from six to eight weeks of pre-employment training so that he may reach production requirements with a minimum of difficulty.
13. Production: In a job shop, each worker is required to finish from 40 to 50 meters per day. In a production shop, the worker is required to finish from 80 to 120 units per day.
14. Interrelation with Preceding and Succeeding Jobs: The cleaning, inspecting and subassembly of parts prepares the meter for final assembly. Final assembly prepares the meter for the testing department.
15. Teaming with Other Workers: Although the meter assembler appears to work alone, it is important that he cooperate with other workers to insure that the production quotas will be met. He must be able to take supervision and to exercise good judgment in performing his job duties and in his relationship with other workers.
16. Modification, Deviation, Special Tools for the Blind: None.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: Worker should have sufficient vision to distinguish colors.
 - b. Conditions Affecting Suitability of a Particular Job: Since it is necessary for the worker to be able to distinguish colors, a partially sighted person with color discrimination would be required for this job.

METER REPAIR

ELECTRIC-METER REPAIRMAN (Contd.)

18. Avoid the Following Conditions:
- a. Visual inspection.
 - b. Testing.
19. Other Jobs Often Combined for Full-time Employment: The disassembly and assembly of meters are often combined to create full-time work.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found: Companies dispensing electricity maintain meter repair departments. The final assembly of electric meters is found in the repair department.

METER REPAIR

PARKING-METER MECHANIC

1. Name Used for Position in Plant Surveyed: Parking-meter Mechanic
(mechanic's helper).

D.O.T. Title: Parking-meter Mechanic

Code: 5-83.499 (This number does not appear in the 1949 edition of the Dictionary of Occupational Titles. However, the section of D.O.T. information, U. S. Department of Labor, has approved this code.)

Alternate Titles: Meter repairman, mechanic's helper, meter assembler, and meter maintenance man.

D.O.T. Definition: Cleans, adjusts, repairs, and tests meters used to indicate the amount of parking time to be consumed. Dismantles meters; inspects, cleans, or replaces component parts; and reassembles meters, using screw drivers, pliers, tweezers, and other special tools; replaces defective meters.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Over 18; possessing average intelligence and mechanical aptitude; trainable; ability to get along with others, take supervision, and to exercise good judgment.

3. Physical Demands:

a. Activities: Sitting, feeling, fingering, handling, reaching, light lifting.

b. Working Conditions: Inside, dry, well-lighted and well-ventilated, free from dust, odors, fumes; working with others.

c. Skills Required: The worker should be able to handle small tools efficiently and should be able to exercise good judgment. No craft skills are necessary.

4. Details of Physical Activities: The worker must be able to take tedium, to work in a sitting position most of the time. Feels and fingers parts for identification and to determine their condition. He must be able to handle small tools and

METER REPAIR

PARKING-METER MECHANIC (Contd.)

parts easily and efficiently. He must be able to work in close proximity with others and to take close supervision.

5. Details of Working Conditions: The parking meter repair job is located inside a building operated by either the police, street maintenance, or traffic departments of a city or county government. It is well-lighted and well-ventilated. There are no fumes, odors, or dust particles to interfere with the health of the worker.
6. Hazards: The work areas and aisles are well-defined. All employees are required to observe normal safety rules and regulations. There is no particular activity that would be hazardous for the worker.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Worker removes the parking meter from the storage area or stock bin and places it on a jig on his workbench.
 - b. Dismantles meter by loosening screws and removing the front of the meter case.
 - c. Removes meter from case after loosening 2 turnbuckle screws.
 - d. Cleans the meter, using air hose to blow dust and other foreign particles from the meter.
 - e. Checks coin mechanism by inserting the coin in the coin slot.
 - f. Checks time indicator and violation flag in the same manner.
 - g. Removes and replaces any defective parts.
 - h. Replaces meter in the case, fastening it in position with 2 turnbuckle screws and replaces front panel of the case.
 - i. Sends meter to testing station, where the timing mechanism is checked.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Workbenches, jigs, storage bins, hand tools, cleaning equipment, buffers, and grinders.

METER REPAIR

PARKING-METER MECHANIC (Contd.)

- b. Setup and Maintenance: Since this job is primarily a bench operation, there is no setup or maintenance of machines; however, each worker is responsible for keeping his workbench in good order.
 - c. Modifications: In some meter repair shops, the job shop method is used; that is, the meter repairman is required to perform the total job of meter repair. In other shops the production method is used; that is, the repair of meters is done on a production-line basis with each worker assigned a specific set of duties.
9. Equipment Variations Which May Be Found in Other Plants: None.
 10. Usual Pre-employment Training: In shops where the job shop method is used, the worker is normally required to be a clock repairman prior to employment. In production-line shops, only the chief meter mechanic or supervisor is required to have the above training.
 11. Usual Training Procedure on the Job: In shops where the production-line method is used, on the job training is provided all workers except those required to be clock makers.
 12. Any Training Deviations Suggested for the Blind: In order for a blind worker to be successfully placed on this type of work, he should have at least 3 months or vocational training in all phases of parking-meter repair, except clock repair work.
 13. Production: There is no standard quota of production. Production is determined by the management of each shop in accordance with its particular needs.
 14. Interrelation with Preceding and Succeeding Jobs: Since the final assembly of meters is the most practical job for a blind worker, it is necessary for him to be able to maintain an even flow of work through his work station. This eliminates the possibility of work piling up in work stations immediately preceding the final assembly of meters.
 15. Teaming with Other Workers: The production unit is close knit, and each worker must cooperate with all other workers in order to maintain an even flow of production.

METER REPAIR

PARKING-METER MECHANIC (Contd.)

16. Modification, Deviation, Special Tools for the Blind: None.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: Normally, employers require that workers have normal vision even though the final assembly of meters may be performed without sight.
 - b. Conditions of Suitability Affecting this Particular Job:
In the final assembly of parking meters, a competent totally blind worker can perform this job satisfactorily.
18. Avoid the Following Conditions:
 - a. Job shop operation because all workers are required to be clock makers.
 - b. Shops in which the inside men are required to work outside as substitutes for meter installers.
19. Other Jobs Often Combined for Full-time Employment: The disassembly and assembly of meters are often combined to create full-time work.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found: This type of job may be found in three possible types of plants:
 - a. Meter repair shop of a city or county government.
 - b. A privately owned shop which contracts for meter repair with a city or county government.
 - c. Factories which manufacture meters often provide repair services to their customers.

METER REPAIR

WATER-METER REPAIRMAN1. Name Used for Position in Plant Surveyed: Meter AssemblerD.O.T. Title: Meter Repairman (any industry)Code: 5-83.471Alternate Titles: Meterman, meter tester, meter connector

D.O.T. Definition: Cleans, adjusts, repairs, tests, and installs meters used to record the volume of gas, oil, or water flowing through pipe lines; dismantles meters, inspects and cleans or replaces parts, and reassembles them, using wrenches, screw drivers, and special tools. Connects meters to testing machines and subjects them to high water pressure to detect leaks; adjusts meters to standards of water, gas, or oil flow. Replaces defective meters (light, heat, and power)(See Electric-meter repairman; flowmeter maintenance man; steam meterman).

In developing this job description, several water-meter repair departments were surveyed. The following jobs were worked on by a totally blind person: disassembly of meters, inspection of parts, repair of meter parts and cases, cleaning of parts, assembly of meters, testing of meters and the disassembly, repair of worn parts, replacement of worn bushings, and reassembly of "gear trains."

2. Usual Operator:a. Sex: Male.b. General Characteristics: Age 18 or older, average intelligence, possessing mechanical aptitude, trainable, good manual dexterity, ability to take supervision and to work closely with others.3. Physical Demands:a. Activities: Standing, stooping, walking, lifting, reaching, fingering, carrying, and handling.b. Working Conditions: Inside, dry, well-lighted, well-ventilated, normal shop noises and free from dust and other foreign particles.c. Skills required: Unskilled.

METER REPAIR

WATER-METER REPAIRMAN (Contd.)

4. Details of Physical Activities: Worker stands most of the time in stooped position over his workbench to perform his job duties. Lifts meter cases (8 to 10 pounds) on to workbench, reaches for parts, fingers and feels parts for identification, and meshes them in place; uses both manual and pneumatic tools; carries meters from workbench to meter rack at the end of his work area.
5. Details of Working Conditions: The work areas and aisles are well-defined. The plant is well-lighted and well-ventilated. In some parts of the country airconditioning has been installed to control humid temperature and to keep dust and other floating foreign particles to a minimum. (Wages, hours, and other benefits compare favorably with similar industrial jobs in the community.)
6. Hazards: There are no hazards in this type of employment, except in the testing area where the worker must handle water under high pressure. All employees are required to follow normal safety rules and regulations.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Places meter on workbench on its side with the bottom plate toward the front.
 - b. Inserts six to ten bolts through the frame and bottom plate of meter and starts the nut on each by hand.
 - c. Tightens the nut with pneumatic socket wrench.
 - d. Places small cog on worm shaft on the top of meter and fastens it in place with a small set screw using a small screw driver.
 - e. Places register in position on top of case, meshing its gears with the cog on the worm gear shaft.
 - f. Fastens register in place with two screws, using a screw driver.
 - g. Places cover over the register and moves the meter on to the tester who after testing meter fastens the cover in place.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Work tables, hand tools (manual and pneumatic), milling machine, lathe, drill press, cleaning machine, floor trucks, grinding and buffing equipment, and testing equipment.

METER REPAIR

WATER-METER REPAIRMAN (Contd.)

- b. Setup and Maintenance: Parts are delivered to the workbenches by porters. Each machine operator is required to maintain and to make all setups on his machine.
 - c. Modifications: Generally, all water meter repair departments are the same--either production-line or job shop methods are used, depending on the size of the shop and the philosophy of the management.
- 9. Equipment Variations Which May Be Found in Other Plants: None.
 - 10. Usual Pre-employment Training: For meter assembler, there is no pre-employment training required; however, machine operators are required to be journeymen machinists.
 - 11. Usual Training Procedure on the Job: On-the-job training, for all positions, except machinists, of about 30 days is all the training that is required.
 - 12. Any Training Deviations Suggested for the Blind: Since it would be difficult for a blind person to reach production during the usual break-in period, it is suggested that a prospective blind worker be given two or three months of pre-employment training to assure him an equal opportunity with sighted workers in reaching and maintaining production quotas.

The reason for deviating from the normal procedure is to enable the blind worker to develop skill in identifying and working efficiently with small parts and hand tools.
 - 13. Production: Workers are required to complete from 100 to 150 meters each working day.
 - 14. Interrelation with Preceding and Succeeding Jobs: The partially assembled meter is received from the subassembly operation which immediately precedes the final assembly of the meter. After the final assembly is completed, the meter is moved on to the testing department.

METER REPAIR

WATER-METER REPAIRMAN (Contd.)

15. Teaming with Other Workers: The final assembly of meters is a necessary operation. Although the worker completes a single operation, it is necessary for him to cooperate with those workers immediately preceding and succeeding him so that production will flow smoothly. He must be able to take supervision and to get along with other people.
16. Modification, Deviation, Special Tools for the Blind: None.
17. Sight Requirements and Conditions:
 - a. Vision required for the job: Although employers normally require a worker to have good eyesight, this job can be performed adequately without sight.
 - b. Conditions Affecting Suitability of a Particular Job: The final assembly of water meters and the repair work on gear trains can be performed by a totally blind person.
18. Avoid the Following Conditions:
 - a. Handling excessive weights.
 - b. Visual inspection of parts.
 - c. Traveling long distances to secure parts.
 - d. Testing equipment.
19. Other Jobs Often Combined for Full-time Employment: Disassembly and final assembly of meters.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found: Water distribution systems, public or privately owned, maintain their own meter repair departments. Other meter repair jobs of a similar nature may be found in natural gas distribution systems.

METER REPAIR

GEAR-TRAIN MECHANIC

1. Name Used for Position in Plant Surveyed: Water-Meter Repairman

D.O.T. Title: Water-Meter Repairman (any industry)

Code: 5-83.465

Alternate Titles: Meterman, flowmeter-maintenance man; meter mechanic.

D.O.T. Definition: Cleans, adjusts, repairs, tests, and installs meters, used to record the volume of water, oil, or gas flowing through pipe lines; dismantles meters, inspects, cleans, and replaces component parts of the gear train mechanism and reassembles them, using wrenches, screw drivers, punch, and drill press; connects meters to testing machines and subjects them to high pressure to detect leaks or defective parts; adjusts meters to standards of water, gas, or oil flow; replaces defective meters (gas, light, and power meterman; see electric meter repairman, flowmeter-maintenance man, steam meterman).

In developing this job description of water-meter repairman - gear-train mechanic, the entire water meter department of several distribution systems were surveyed by a totally blind person. The following jobs were worked on: disassembly of meters, inspection of parts, repair of meter parts and cases, cleaning of parts, assembling of meters, testing meters, disassembling, repairing, or replacing worn parts and bushings, and reassembling of gear trains.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Over 18, average intelligence, possessing mechanical aptitude, trainable, good manual dexterity, ability to take supervision and to get along with others.

METER REPAIR

GEAR-TRAIN MECHANIC (Contd.)3. Physical Demands:

- a. Activities: Standing, sitting, walking, carrying, feeling, fingering, reaching, and handling.
- b. Working Conditions: Inside, dry, well-lighted, well-ventilated, normal shop noises, free from dust and other foreign particles.
- c. Skills Required: The worker on this job must be a skilled machine operator, adept in working with small tools and parts; ability to exercise good judgment and to take supervision.

4. Details of Physical Activities: The worker sits or stands most of the time at his workbench. In performing the normal duties of his job, he walks back and forth in the work area to secure parts. In order to identify parts and to determine if they are in good condition, it is necessary for him to feel and finger each part separately. The worker not only handles small parts, but he must be able to use and handle efficiently small tools.5. Details of Working Conditions: The work areas and aisles are well-defined and the plant is well-lighted and well-ventilated; in some instances, special lighting is installed over the workbench to enable the sighted worker to see and identify small parts more readily. The plant is often air-conditioned to keep it free from dust and other foreign particles and to maintain uniform temperature control.6. Hazards: Employees are required to observe normal safety rules and regulations. There is nothing in the work area that would interfere with the employee's health. This particular job has no hazard connected with it.7. Sequence of Steps in Position in Plant Surveyed:

- a. The gear-train mechanic disassembles the gear train by loosening two screws in the top half of the gear train frame.
- b. Removes bushings from the gear-train frame, using a punch and hammer.

METER REPAIR

GEAR-TRAIN MECHANIC (Contd.)

- c. Replaces bushings in the gear-train frame, using a hammer to force them into position.
 - d. When the bushings are too long, the worker saws them off flush with the frame, using a small hack saw.
 - e. Drills a hole in the center of the bushing with a drill press.
 - f. Reassembles the gears onto the frame and fastens the top half of the frame into position with two screws.
 - g. Places finished gear train in the storage bin.
8. Equipment as Found in the Particular Plant Surveyed:
- a. Identification: Workbench, hand tools (manual and power), milling machine, lathe, drill press, cleaning (degreasing) machine, floor trucks, grinding and buffing equipment, and testing instruments.
 - b. Setup and Maintenance: Parts and materials are delivered to the workbench by stock handlers or porters. Machine operators are required to do the necessary setup on their machines; however, if a machine needs repairing, a maintenance man is available for this service.
 - c. Modification: Generally, water-meter repair shops use one of two methods of operation--either the job shop method or the production-line method.
9. Equipment Variations Which May Be Found in Other Plants: None.
10. Usual Pre-employment Training: There is no pre-employment training required, except for maintenance man, who must be a journeyman machinist.
11. Usual Training Procedure on the Job: Normally, a worker can be trained for this job during the usual 30-day break-in period.
12. Any Training Deviations Suggested for the Blind: Three months of prevocational and shop type experience in working with small parts and hand tools will assure a blind worker succeeding in this job.

METER REPAIR

GEAR-TRAIN MECHANIC (Contd.)

13. Production: A worker on this job is normally required to finish from 20 to 40 gear trains per day.
14. Interrelation with Preceding and Succeeding Jobs: The gear-train mechanic receives his parts from the cleaning machine operator and his new parts from the stockroom. The final assembly of the meter is dependent on the gear-train mechanic for gear trains.
15. Teaming with Other Workers: Although the worker completes a single operation, it is necessary for him to cooperate with those workers immediately preceding and succeeding him so that production will flow smoothly.
16. Modification, Deviation, Special Tools for the Blind: Since a competent blind worker can perform this job as it is set up for a sighted worker, no change in either the job structure or tools is necessary.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: Employers normally require that a worker have good vision for this job.
 - b. Conditions Affecting Suitability of a Particular Job: In most instances, this job can be performed adequately and satisfactorily by a competent totally blind worker.
18. Avoid the Following Conditions:
 - a. Lifting and handling excessive weights.
 - b. Traveling long distances to obtain parts.
 - c. Shops where this job is combined with a journeyman machinist operation to create full-time employment.
 - d. Visual inspection.
19. Other Jobs Often Combined for Full-time Employment: This job is not often combined with other jobs to create full-time employment; however, in small shops, it will be combined with either the milling machine or lathe operation for this purpose.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found: This job may be found in water-meter repair departments of privately or publicly owned water distribution systems.

LIST OF SUPPLEMENTS TO HANDBOOK OF REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

Note on Term Supplement:

(The term "supplement" refers to items issued for insert in the "Handbook of Representative Industrial Jobs for Blind Workers", and is not to be regarded as an integral part of the organizational phrasing of the book. "Supplements" have, for the most part, been "inserts", not additions to a finished text, but new elements of the original. Some supplements have consisted of additional "job categories"; others have consisted of additional job descriptions under existing categories. One, Supplement 12, Part III, contains additional expository material. This list is furnished for the convenience of those using the Handbook when checking for completeness.)

SUPPLEMENT NUMBERS	CATEGORY SYMBOL AND NUMBER
1. Slaughtering and Meat Packing (additional category) 7/7/48	SI-3
2. Machine Operations (additional category) 2/1/49	GC-4
3. Dairy Products (additional category) 3/10/49	SI-4
4. Wrapping and Packaging (additional category) 4/22/49	GC-2
5. Foundries (additional category) 5/15/49	SI-6
6. Photographic Processing (additional category) 6/30/49	GC-11
7. Material Handling (additional category) 11/14/49	GC-3
8. Mattresses and Bedsprings (additional category) 11/25/49	SI-5
9. Garment Industry (additional category) 11/30/49	SI-7
10. Machine Tending, Feeding, and Off-bearing (additional category) 1/5/50	GC-6
11. Boot and Shoe Industry (additional category) 8/18/50	SI-16
12. Job Analysis with Respect to Blindness (additional expository material) 11/14/50	PART III
13. Machine Operations (Metal Working Power Tools) (additional category) 8/31/51	GC-5
14. Automotive Servicing (additional category) 6/22/53	SI-8
15. Sand Shake-out (additional job to existing category-Foundries) 9/14/53	SI-6
16. Sleeve Presser (additional job to existing category-Garment Industry) 9/14/53	SI-7
17. Sole Roughing and Sole Pressing (additional job to existing category-Boot and Shoe Industry) 12/15/53	SI-16
18. Meter Repair (additional category) 1/1959	SI-9

FEDERAL SECURITY AGENCY
Office of Vocational Rehabilitation
Washington 25, D. C.

August 18, 1950

REHABILITATION SERVICE SERIES NUMBER 58 - SUPPLEMENT 11

To: Divisions of Vocational Rehabilitation (in States with no
separate agency for the blind); Commissions and Other
Agencies for the Blind

Subject: Supplement to Handbook of Representative Industrial Jobs
for Blind Workers - Category SI-16 - Boot and Shoe Industry

The attached information on the Boot and Shoe Industry is to be the 8th insertion in the Handbook of Representative Industrial Jobs for Blind Workers, Part I, Specific Industries Series. It describes a few of the typical jobs frequently found in the industry suitable for performance without the use of sight. Like the jobs described in the previous issues, those in this category have been observed and tested by a blind member of the staff of Services for the Blind.

Other categories of job specifications are being prepared and will be forwarded to you at an early date. Additional copies of the Handbook or any of its supplements will be furnished upon request.

We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

D. H. Dabelstein

Donald H. Dabelstein
ASSISTANT DIRECTOR

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

SPECIFIC INDUSTRIES SERIES
Category SI-16

BOOT AND SHOE INDUSTRY

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

BOOT AND SHOE INDUSTRY

General Information Sheet

Character of the Industry: This industry includes occupations concerned with the manufacture of boots, leggings, moccasins, sandals, shoes, slippers, and allied footwear made of canvas and other textile fabrics and leather. The industry also includes the manufacture of such boot and shoe cut stock and findings as are made of leather, textile fabrics and artificial leathers, leather welting, shanks, heel and toe caps, leather shoe laces, finished wooden heels, and other boot and shoe findings.

Judged in comparison with other major activities, this industry is one of the largest of the modern business world. It is the fifth largest industry employing wage earners in the United States out of a group of 177 industries, each employing 10,000 or more workers. It is twelfth in the manufacture value of merchandise produced, and fourteenth in the cost of materials used.

In 1949 more than 200,000 workers were employed in the industry, 56% of whom were women. The plants varied in size from those employing several thousand workers to those employing as few as twenty-five. It is estimated that every sixty seconds there will come streaming off the assembly lines more than 4,166 pairs of shoes of different types; size, heel height, and pattern, or more than two million pairs of shoes a day. This mass production output is achieved as a result of the high degree of mechanization which prevails in each of the slightly more than 1,000 establishments in the United States.

Today, shoe machines are built on the principle of one machine to each operation, and in some factories as many as 250 employees, including hand workers and machine operators, may contribute to the making of a pair of shoes. Individual establishments usually confine their production to a particular type of footwear with a wide range of styles and sizes; thus a plant producing men's shoes will not manufacture anything even so closely related as men's slippers, nor will the plant that manufactures women's dress shoes produce play shoes. The modern shoe factory is usually divided into eight departments, namely: (1) uppercutting--cutting room, (2) upperfitting--stitching room, (3) stock fitting--sole leather room, (4) lasting room, (5) bottoming room, (6) making room, (7) finishing room, and (8) treeing and packing room.

General Information Sheet (Cont'd)

Distribution of Industry: Large corporations have continued to become more important in this industry during very recent years, many of these now having factories scattered throughout various States. Reliable trade sources estimate that the capacity of the ten largest shoe producing corporations is equal to more than 50 percent of the total shoe output in the United States. However, this should not necessarily lead to the belief that the shoe industry is controlled by a few persons. There are several hundred shoe factories with an annual output of less than 350,000 pairs each, which have been operating profitably for many years. Generally, the larger producers manufacture a wide range of types and styles, whereas the smaller firms make a few types but in many styles. More than 85 percent of the production of leather footwear is accomplished in nine States: New York, Massachusetts, Missouri, New Hampshire, Illinois, Pennsylvania, Maine, Ohio, and Wisconsin.

Type of Workers Usually Employed: 56 percent of the workers in this industry are women. Men and women are employed as either hand workers or machine operators. A large proportion of the operations requires skilled workers. Since training can only be secured within the industry new employees are hired as stock handlers, truckers, and the like.

Working Conditions: Working conditions compare favorably with the most modern factory working conditions of other industries. Day work prevails. The piecework system will be found in one form or another in most plants. Plants are usually noisy because of the extensive use of high speed power machinery. Movable racks, each holding thirty-six pairs are used to move the shoes from one operation to another. Consequently, the aisles are usually congested. Adequate lighting and ventilation usually exist. The industry is highly unionized.

Hazards, Safety Precautions, and Health Conditions: The principal dangers of injury to shoe workers are laceration of fingers by sewing machine needles, cuts from knives and electrical cutting machines, and bruises to the hands or fingers from hydraulic presses or closing jaws of the jigs of automatic machinery. Needle punctures are not usually of a serious nature and as a rule respond readily to first aid treatment. The industry is safety conscious and most workers are instructed in a safe manner of performing their work.

General Information Sheet (Cont'd)

Power cutting machines and presses are generally well guarded. Serious cuts or bruises usually require expert medical attention. The soles of workers' shoes pick up numerous tacks which are lying on the floor in many sections of a department in most plants. These should be removed by the worker before he leaves at night.

General Coverage Jobs Pertinent: Carton set up in GC-1, wrapping and packaging GC-2, material handling GC-3

Jobs Usually to be Avoided: Power sewing machine operator; clipping threads, tack pulling machine operator; and insole tacker, hand and machine.

Combination Jobs:

- a. Screw puller and racker
- b. Last puller and tack puller
- c. Tack puller, second laster and material handler - transferring racks.

BOOT AND SHOE INDUSTRY

SECOND LASTER

1. Name Used for Position in Plant Surveyed: Second laster

D. O. T. Title: Laster, Second

Code: 4-61.662

Alternate Titles: Relaster

D. O. T. Definition: Replaces last in a shoe after sole has been sewed to the upper so that further processing operations can be carried out. Inverts last which has been bent at the hinge (broken last) and puts pin of stationary jack in small hole (Thimble) in heel of last. Sets toe of shoe over toe of last and pulls shoe backward toward heel. Pulls heel of shoe off last with shoehorn and at the same time straightens last so that it is no longer broken.

Items Worked on in Plant Surveyed: Women's dress shoes (platform)

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, robust, quick hand and arm movements, methodical, average mental ability.

3. Physical Demands:

a. Activities: Standing, reaching, lifting, pushing, pulling, handling, fingering, feeling, speaking, hearing, working speed.

b. Working Conditions: Inside, noisy, adequate lighting and ventilation, works with others.

c. Skill Required: Semi-skilled. Ability to coordinate the movement of hands and arms, to quickly and accurately place and locate items within arm's reach, and to mentally record the process of the work being done.

4. Details of Physical Activities: Stands all day working rapidly with hands and arms; continually reaches up to three feet at from

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

SECOND LASTER (Cont'd)

shoulder to knee height to secure and dispose materials weighing approximately three pounds; continually pushes, pulls, handles, fingers; frequently pushes and pulls shoe racks weighing approximately fifty pounds, a distance of from one to ten feet, and feels items to remove them from or place them on tightly fitting forms; talks with and listens to others to exchange necessary information concerning the work being done; listens to the noise made by the adjacent soling machine so that he may synchronize his work with that of his team mate.

5. Details of Working Conditions: Works inside and around others in adequately lighted and ventilated area which is noisy because of the operation of nearby high speed power machines.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Takes a pair of shoes from one end of the upper row of a rack which he has secured from the adjacent storage area and places it in front of him on the work table.
- b. Takes one shoe and turning it upside down, places the thimble of its last on the peg of the last pulling device which is fastened at the front edge of the work table. Grasps the heel with one hand and the toe with the other, "breaks" the last and removes the shoe by pressing downward with the hand grasping the toe.
- c. Removes the last from the other shoe in the same manner.
- d. Sets the pair of shoes on the upper shelf of the work table and places the corresponding pair of lasts on the table directly beneath the shoes.
- e. Working along the upper shelf of the shoe rack, removes shoes in order, one pair at a time, removes the lasts and sets pairs of shoes and lasts following the established pattern. (Sewing machine operator takes one pair of shoes at a time from the work bench, attaches the platform and returns the pairs to their original position on the shelf.)

BOOT AND SHOE INDUSTRY

SECOND LASTER (Cont'd)

- f. Working from the starting end of the shelf, takes a pair of shoes to which the platforms have been sewed along with the corresponding lasts beneath them.
- g. Places the thimble of one last over the pin of the last pulling device.
- h. Grasping the proper shoe by the heel and toe, works it onto the last.
- i. By pulling up on the toe straightens the last.
- j. Repeats this procedure with the other last and shoe.
- k. Returns the pair of relasted shoes to their original place on the rack.
- l. Continues this procedure until all the shoes on the rack have been relasted.
- m. Pushes completed rack into an open storage area for removal by another worker and secures a new rack.

NOTE: Occasionally this worker may be required to clip loose ends of thread from the platform with a knife. On certain designs the heel strap is fastened to the last with a tack. In this event the worker is required to remove the tack but is not expected to replace it.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Shoe racks, last puller, two-level work table
- b. Set-up and Maintenance: None
- c. Modifications: None

9. Equipment Variations Which May Be Found in Other Plants:

Substantially the same in all plants.

10. Usual Pre-employment Training: None

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

BOOT AND SHOE INDUSTRY

SECOND LASTER (Cont'd)

11. Usual Training Procedure on the Job: Supervisor instructs the new worker in all steps of the operation.
12. Any Training Deviation Suggested for the Blind: None
13. Production:
 - a. Full: 75 to 100 pairs per hour
 - b. Time to Reach Normal Efficiency: One month
14. Interrelation with Preceding and Succeeding Jobs: The production of this operator must be synchronized with the production of other operators in the plant or output will be affected.
15. Teaming with Other Workers: This worker and the platform sewing machine operator work as a team with the second laster servicing the sewing machine operator and subsequently preparing the shoe to continue along the production line.
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel outside the work area to secure and dispose of material. No responsibility for clipping threads or writing up job tickets.
 2. For Partially Sighted: Sufficient vision to quickly and accurately locate any threads that need to be clipped and to write up job tickets.
18. Avoid the Following Conditions: Transfer to other jobs which cannot be performed without the use of sight.
19. Other Jobs Often Combined for Full Time Employment: Final last pulling, pulling tacks, and transferring shoes from pin to platform racks.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

Establishments manufacturing women's shoes.

BOOT AND SHOE INDUSTRY

SOLE WETTER1. Name Used in Plant Surveyed: Sole WetterD. O. T. Title: Sole wetterCode: 8-61.01Alternate Titles: Dampener, muller, sole temperer, sole treater, stock temperer, stock wetter.

D. O. T. Definition: A laborer. Tempers and bleaches outsoles of shoes by dipping them in a solution of water and sole softener to make them more flexible so that they can be cut, shaped, and stitched more easily. Adds water-softener powder, in proper proportion, to lukewarm water and stirs to dissolve powder. May cover soles with sacks so that they will not dry too quickly.

Items Worked on in Plant Surveyed: Shoe soles2. Usual Operator:a. Sex: Maleb. General Physical Characteristics: Any size, quick, methodical, average mental ability.3. Physical Demands:a. Activities: Walking, standing, turning, reaching, lifting, carrying, pushing, pulling, handling, fingering, feeling, talking, hearing.b. Working Conditions: Inside, wet, adequate lighting and ventilation, works around others.c. Skill Required: Unskilled. Ability to coordinate hand and arm movements; to quickly and accurately locate items within a work area of approximately fifteen square feet, and to mentally record the various stages of the work being done.4. Details of Physical Activities: Stands all day working rapidly with hands and arms; occasionally walks up to fifteen feet to secure and dispose of materials; frequently pushes and pulls push racks

BOOT AND SHOE INDUSTRY

SOLE WETTER (Cont'd)

to position them for working convenience; turns, reaches, lifts, and carries stacks of flat thin items weighing up to five pounds a distance of approximately five feet; handles, fingers, and feels flat items approximately four inches by twelve inches to immerse them in softening solution and arrange them in a predetermined order; talks with and listens to others to exchange necessary information.

5. Details of Working Conditions: Works around others, inside, in adequately lighted and ventilated area which is wet, because of the dripping of softening solution from the soles.
6. Hazards: None, except that certain types of skin may become irritated by the water softener.
7. Sequence of Steps in Operation in Plant Surveyed:

Worker:

- a. Secures a rack of soles from the near-by storage area, approximately fifteen feet away, and pushes it into a convenient working position.
- b. Takes as many soles as he can handle easily between both hands from the left end of the shelf of the rack. In following the original line-up, sets them on the left side of the shelf above the tub of sole softener.
- c. Takes five or six soles on the left end of the row and fans them between his fingers.
- d. Completely immerses these soles in the softening solution for a few seconds (experience and judgment as to the type of leather will determine the immersion time), and then setting the soles on edge starts a row on the right side of the work table.
- e. Immerses another group in the same manner and working toward the right adds them to the row on the right side of the work table, thus preparing them to be returned to the rack in their original order.
- f. Completes the wetting of the remainder of the soles in the same manner.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

SOLE WETTER (Cont'd)

- g. Takes the row of wetted soles from the right side of the work table and returns them to their original position on the rack.
- h. Continues to work along the shelf in the same manner until all the soles have been dampened making sure that they are replaced in their original order.
- i. Works from shelf to shelf in the same manner until the rack is completed.
- j. Pushes the rack into a near-by open area for removal by the rounder.

NOTE: Certain types of soles are sponged instead of immersed. In this event the worker takes them one at a time from the dry rack, rubs each side gently with a sponge which has been soaked in the softening solution, and places them in the proper order on the right side of the work table before returning them to the racks.

The previous operator separates cases of soles by reversing the last sole in each case. A job ticket accompanies each case of soles, but it is not necessary for the worker to read it nor to place it in any particular position so long as he inserts it between two soles in the case.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Tub containing softening solution with work table above it and movable racks which resemble an open book case.
- b. Set-up and Maintenance: Each worker is required to mix his own solution of sole softener. The blind person can easily accomplish this by measuring the amount of softener to be used with a cup or a similar container. One batch is usually sufficient for a full day.
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:
Substantially the same in all plants.

10. Pre-employment Training: None

BOOT AND SHOE INDUSTRY

SOLE WETTER (Cont'd)

11. Usual Training Procedure on the Job: The supervisor instructs a new worker in all steps of the operation.
12. Any Training Deviations Suggested for the Blind: None
13. Production:
 - a. Full: 4,000 pairs a day
 - b. Time to Reach Normal Efficiency: One month
14. Interrelation with Preceding and Succeeding Jobs: This worker must keep the rounder supplied with work at all times.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of Particular Job:
 1. For the Totally Blind: No travel outside the work area to secure and dispose of materials.
 2. For the Partially Sighted: Travel requirements must be compatible with type and amount of worker's vision.
18. Avoid the Following Conditions: Transfer to other jobs which cannot be performed without the use of sight.
19. Other Jobs Often Combined for Full Time Employment: None
20. Industries, Parts of Industries, or types of Plants Where This Type of Job is Frequently Found:

The sole leather plants or sole leather departments of shoe factories.

BOOT AND SHOE INDUSTRY

SCREW REMOVER

1. Name Used for Position in Plant Surveyed: Screw Remover

D. O. T. Title: Screw Remover

Alternate Titles: Screw Puller

D. O. T. Definition: Removes hook eye screws, put in temporarily to hold the heel to the assembled shoe, by pushing head of screw into the opening of rotating chuck on screw-remover machine which loosens and removes the screw from the heel and last.

Items Worked on in Plant Surveyed: Women's shoes

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, quick, average mental ability.

3. Physical Demands:

a. Activities: Standing, turning, reaching, pushing, pulling, handling, fingering, feeling, talking, hearing, working speed.

b. Working Conditions: Inside, adequate lighting and ventilation, works around others.

c. Skill Required: Unskilled. Ability to quickly and accurately locate items within arm's reach, to hold small items firmly in the hand, to control the movement of the hand, and to tactually recognize various surfaces quickly.

4. Details of Physical Activities: Stands all day, working rapidly with hands and arms continually; turns to reach a few feet to secure and dispose of items weighing from one to three pounds; occasionally pushes and pulls trucks weighing up to seventy-five pounds from one to fifteen feet; handles, fingers, and feels items weighing from one to three pounds to position them for the work to be done; talks with and listens to others to exchange necessary information.

ADDITIONAL JOBS LISTED IN PART II, GENERAL COVERAGE SERIES

BOOT AND SHOE INDUSTRY

SCREW REMOVER (Cont'd)

5. Details of Working Conditions: Works around others, inside in adequately lighted and ventilated area.
6. Hazards: None.
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Wheels a rack of shoes into a convenient working position.
- b. Starting at one end of the upper row, removes one shoe and grasps it beneath the arch with one hand, and with the other hand guides the hook-eye which protrudes from the screw hole in the upper part of the last into the cup of the rotating chuck of the shoe pulling machine.
- c. As he feels the slot in the upper portion of the cup engage the eye of the screw, presses upward on the shoe, thus permitting the machine to loosen the screw.
- d. Brings the shoe away from the machine and removes the screw with his free hand.
- e. Drops the screw into the pan on the table beneath the chuck of the screw pulling machine.
- f. Returns the shoe to its original place on the rack.
- g. Repeats this procedure until the rack is completed.
- h. Pushes the rack into a nearby open area for removal by another worker.

NOTE: The outer surface of the chuck of the screw pulling machine is smooth. Consequently, it is a safe practice for the operator to touch any portion of it while it is revolving.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Shoe remover machine, shoe racks and catch bucket for screws.

BOOT AND SHOE INDUSTRY

SCREW REMOVER (Cont'd)

- b. Set-up and Maintenance: None
- c. Modification: None
- 9. Equipment Variations Which May be Found in Other Plants:
Substantially the same in all plants.
- 10. Usual Pre-employment Training: None
- 11. Usual Training Procedure on the Job: Supervisor instructs a new worker in all steps of the operation.
- 12. Any Training Deviations Suggested for the Blind: None
- 13. Production:
 - a. Full: 2500 pairs of shoes per day
 - b. Time to Reach Normal Efficiency: One month
- 14. Interrelation with Preceding and Succeeding Jobs: Not significant
- 15. Teaming with Other Workers: None
- 16. Modification, Deviation, Special Tools for the Blind: None
- 17. Sight Requirements and Conditions:
 - 1. For the Totally Blind: No travel to secure and dispose of
 - 2. For the Partially Sighted: Travel to secure and dispose material must be compatible with the worker's type and amount of vision.
- 18. Avoid the Following Conditions: Transfer to other jobs which cannot be performed without the use of sight.
- 19. Other Jobs Often Combined for Full Time Employment: Last pulling, tack pulling, and transferring racks.
- 20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

Manufacturers of women's shoes.

OVR 33:5 :D:5
Supplement 17

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D. C.

December 15, 1953

REHABILITATION SERVICE SERIES NUMBER 50 - SUPPLEMENT 17

TO: Divisions of Vocational Rehabilitation (in States with no separate agency for the blind); Commissions and Other Agencies for the Blind

SUBJECT: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category SI-16 (Boot and Shoe). Sole Roughing and Sole Pressing

The attached two job descriptions, Sole Roughing, and Sole Pressing, are to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as additional jobs to the 16th category, Part I, Specific Industry Series. Like the jobs already described in this category they have been observed and tested by a blind member of the staff of Services for the Blind.

Additional copies of the Handbook or any of its supplements will be furnished upon request.

We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

D. H. Dabelstein
D. H. Dabelstein
ASSISTANT DIRECTOR

Attachments (2)

DISTRIBUTION

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BOOT AND SHOE INDUSTRY

SOLE ROUGHING1. Name Used for Position in Plant Surveyed: Sole RoughingD.O.T. Title: Sole RoughingCode: 6-61.528Alternate Title: Bottom Rougher

D.O.T. Definition: Operates buffing wheel to which sole is applied in order that a rough surface will be created to make gluing possible. Holds sole of shoe against revolving abrasive-covered wheel of buffing machine which roughens soles.

Items Worked on in Plant Surveyed: Women's casual "California Shoe."

2. Usual Operatora. Sex: Male or femaleb. General Characteristics: Any size, nimble, average mental ability.3. Physical Demandsa. Activities: Standing, reaching, stooping, pushing, pulling, turning, feeling, handling, talking, working speed.b. Working Conditions: Inside, good lighting, good ventilation, noisy, working with others.c. Skill Required: Must be able to distinguish between smooth and rough surfaces; reach for and handle light-weight materials; determine amount of pressure worker must exert on materials; coordinate movements of hands.

4. Details of Physical Activities: Stands all day, reaches for shoe soles which are then applied to a power-driven buffing wheel. Worker must feel sole to make sure that entire surface is roughened so that gluing will be effective. After soles are roughened they are placed in rack to left of worker.

5. Details of Working Conditions: Inside, good lighting and ventilation, noisy, and working with others.

6. Hazards: Carelessness could result in worker suffering severe friction burns by touching hands of buffing wheel.

SOLE ROUGHING (Contd.)7. Sequence of Steps in Position in Plant Surveyed

Worker:

- a. Obtains soles from rack at right, applies side of sole to buffing wheel.
- b. Exerts moderate pressure and moves sole about on wheel until entire surface has been roughened.
- c. The surface is then inspected by touch to make sure that entire surface is rough. If smooth spots are found sole is again applied to buffer.
- d. If inspection reveals that the entire surface is rough, materials are then placed in racks to left.

8. Equipment as Found in the Particular Plant Surveyed

- a. Identification: Racks and Buffing Wheel
- b. Set-up and Maintenance: None
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants: None10. Usual Pre-employment Training: None11. Usual Training Procedure on the Job: Supervisor instructs a new worker in all steps of the operation.12. Any Training Deviations Suggested for the Blind: None13. Production

- a. Full: 3600 items per day
- b. Time to Reach Normal Efficiency: 2 weeks

14. Interrelation with Preceding and Succeeding Jobs: None15. Teaming with Other Workers: None16. Modification, Deviation, Special Tools for the Blind: None

BOOT AND SHOE INDUSTRY

SOLE ROUGHING (Contd.)

17. Sight Requirements and Conditions
- a. Vision Required for the Job: None
 - b. Conditions affecting Suitability of a Particular Job:
 - 1. For the Totally Blind: No consideration given to color, size or other identifying marks. No need for travel.
 - 2. For the Partially Sighted: Same
18. Avoid the Following Conditions: Transfer to other jobs not suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: None
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found: All shoe industries.

BOOT AND SHOE INDUSTRY

SOLE PRESSING

1. Name Used for Position in Plant Surveyed: Sole Pressing

D.O.T. Title: Sole Pressing

Code: 6-61-531

Alternate Titles: Beater-out, leveling machine; leveler; leveling machine operator; out-sole-leveler; sole leveling machine operator.

D.O.T. Definition: Shoe soles are pushed through and back between rollers which exert pressure sufficient to remove air pockets and unevenness created by the gluing of the parts of the sole. Flattens the insoles or outsoles of shoes which have had a ridge raised around the sole by the stitching machine.

Items Worked on in Plant Surveyed: Women's casual "California style shoes."

2. Usual Operator

a. Sex: Male or female

b. General Characteristics: Any size, nimble, average mental ability.

3. Physical Demands

a. Activities: Standing, lifting, reaching, pushing, pulling, stooping, handling, feeling, talking, hearing, and working speed.

b. Working Conditions: Inside, adequate lighting, good ventilation, noisy, works around others.

c. Skill Required: Ability to handle light material rapidly; reach for materials; and coordinate hand movements.

4. Details of Physical Activities: Stands all day, turns, reaches for light-weight materials, feeds material into rollers, retracts material from rollers, and places material in bins.

5. Details of Working conditions: Inside, adequate lighting, good ventilation, noisy, works around others.

6. Hazards: Worker could get hand caught in rollers if safety pattern were not followed.

SOLE PRESSING Contd.7. Sequence of Steps in Position in Plant Surveyed

Worker:

- a. Reaches for material to his right, feeds freshly glued sole through pressurized roller similar to a washing machine wringer.
- b. When rollers reverse direction automatically, the worker extracts sole as it returns through the rollers.
- c. In some instances where types of sole require it, the sole is reversed and the operation is repeated.
- d. When pressing operation is completed, worker places material in bin to his left.

8. Equipment as Found in the Particular Plant Surveyed

- a. Identification: Material bins, leveling machine, or rolling machine.
- b. Setup and Maintenance: None
- c. Modification: In some factories soles are pressed or leveled while on the last. This is especially true in men's shoe factories.

9. Equipment Variations Which May be Found in Other Plants:

Where pressing or leveling is done while on the last, equipment is slightly different and involves power control by the operator using a foot lever.

10. Usual Pre-employment Training: None11. Usual Training Procedure on the Job: Supervisor instructs new worker in all steps of the operation.12. Any Training Deviations Suggested for the Blind: None13. Production

- a. Full: 50 cases or 3600 items minimum
- b. Time to Reach Normal Efficiency: 2 weeks

14. Interrelation with Preceding and Succeeding Jobs: None

SOLE PRESSING (Contd.)

15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: No consideration must be given to sizes, colors, or other identifying markings.
 2. For the Partially Sighted: Same
18. Avoid the Following Conditions: Transfer to jobs where vision is needed.
19. Other Jobs Often Combined for Full-Time Employment: None
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found: All shoe industries.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington, D. C.

HANDBOOK OF REPRESENTATIVE INDUSTRIAL JOBS
FOR BLIND WORKERS

PART II

General Coverage Series

The General Coverage Series of Job Specifications is composed of a series of similar jobs found in substantially the same form in many different industries. The jobs are grouped in accordance with their common characteristics of job family. Examples of such groups are: wrapping and packaging; setting up cartons; machine tool operation; metal bench work; mechanical assembly and inspection.

There is an Information Sheet for each general group which contains the following data: general specifications of the job category and the job family represented, including alternate job titles as shown in the USES Dictionary of Occupational Titles; characteristics of workers usually found in the jobs; physical requirements, aptitudes, and abilities; training and preparation procedures; safety precautions, health conditions, or danger encountered; a list of jobs in the category usually suitable for a blind worker and for which a job specification is included in these materials; a listing of industries in which this job category is usually found; examples of job combinations which add up to total employment for a blind worker; and a listing of jobs which should be avoided although they may at first appear to be feasible for a blind person.

For each job there is a Job Specification which contains the following information: The name of the position and item (s) worked on as found in the particular factory; job title; alternate titles; USES Dictionary of Occupational Titles, general description and Code number; skill required; mental, physical and other characteristics of the usual worker; physical demands of the job; work steps of the job as observed in a particular factory; equipment used with name and description, setup and maintenance requirements, and by whom this service is provided; pre-employment and on-the-job training procedures, deviations or additions to training procedures suggested for the blind; normal production and time allotted to reach normal efficiency; relationship of this job to others and teaming with other workers; modification, deviation, and special tools required by a blind worker; minimum sight requirements for the performance of the job under most favorable circumstances, together with conditions which should exist before a job is considered suitable for a blind person.

Materials will be released as circumstances permit for these and other categories.

HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

GENERAL COVERAGE SERIES

Category GC-1

CARTON SETUP

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

GENERAL COVERAGE SERIES

CARTON SETUP

General Information Sheet

D.O.T. Alternate Titles for Box Maker, Cardboard II: Box assembler, cardboard; box boy; box former, cardboard; box opener; box shaper, cardboard; caddy folder; caddy former; caddy maker; carton assembler; carton folder; carton former; carton maker; carton-parts assembler; case maker; set-up girl; setter-up.

Description of Job Category: In general this operation is concerned with setting up cardboard and corrugated cartons to make them ready to receive materials or merchandise. These cartons have been prefabricated and delivered to the user flattened or as flat blanks and tied into bundles ready for use. D.O. T. Description: A Laborer, Process. Folds ready-cut box blanks along scored lines and fastens the edges together by one of the following methods: (1) coats flaps with glue and presses them together; (2) interlocks the corners by means of tabs; (3) seals edges with strip of gummed tape; (4) staples edges together by means of powered stitching machines, ref. Box Stitcher.

May utilize a wooden block, operated by means of a foot pedal, as a "form around which to fold the carton."

Characteristics of Usual Worker: Women or girls are usually found on these jobs; however, men or boys are frequently engaged in the setting up of medium and large size corrugated cartons.

Physical Requirements, Aptitudes, and Abilities: The jobs usually require dexterity both in finger and arm movement, orientation and often physical stamina. Usually the worker must maintain a constant and rapid pace.

Training and Preparation Procedures: The worker is usually given primary instruction by the Supervisor on the job and allowed practice time, from one day to several weeks, before being expected to reach normal efficiency. Worker entirely new to carton setup may be started on a comparatively simple type of work detached from a production line and later advanced to more complicated or demanding positions.

CARTON SETUP (Contd.)

Safety Precautions, Health Conditions, Hazards: There are seldom any special safety precautions necessary, or hazards present; health conditions will vary with the industry but are usually good. It will be necessary for the worker's hands to become toughened against the wear and small cuts caused by the cardboard, and it is sometimes necessary to resort to taping of fingers and wearing of wrist cuffs.

Industries Where This Category is Frequently Found: This category may be found in any industry whose product or merchandise is distributed in cardboard or corrugated cartons. In some plants where the main line production does not furnish job opportunities, carton forming may be one of the auxiliary operations which does provide an employment opportunity.

Jobs Usually to be Avoided Although Seemingly Suitable: Situations involving the application of glue and other adhesives with a brush must often be avoided for a totally blind person. All carton set-up jobs should be carefully checked as to arrangements for securing and disposing of material.

Combination Jobs: Other jobs often combined for full-time employment: This job may logically be combined with any or all of the following: Machine feeding, off-bearing, wrapping, or packing.

CARTON SETUP

CARTON FORMER

1. Name Used for Position in Plant Surveyed: Carton Former (corrugated flats, known in trade as slotted cartons, regular or special).
D.O.T. Title: Box Maker, Cardboard II
Code: Laborer, Process--Any industry such as confectionery, 8-05.21.
Alternate Titles: See General Information Sheet.
D.O.T. Definition: See General Information Sheet.
Items Worked on in Plant Surveyed: Corrugated cartons.
2. Usual Operator:
 - a. Sex: Male, or female, depending on size and weight of carton.
 - b. General Characteristics: Any size, good orientation, agile, good physical stamina.
3. Physical Demands:
 - a. Activities: Standing, turning, reaching, lifting, handling, feeling.
 - b. Working Conditions: Inside, adequate lighting, adequate ventilation, working around others.
 - c. Skill Required: Unskilled. Good orientation to work area; good hand and arm coordination and dexterity.
4. Details of Physical Activities: Must stand all day, move about work area, lift bundles of carton blanks from truck and place on work table and stack formed cartons on truck ready for removal.
5. Details of Working Conditions: The work is usually performed under very favorable conditions. The work area is usually located in a well-lighted and well-ventilated room where the surroundings are comparatively clean and comfortable.

CARTON SETUP

CARTON FORMER (Contd.)

6. Hazards: There are usually no hazards to speak of except that the handling of the cartons or gummed tape may cause small lacerations, making it necessary to tape the fingers or wear wrist cuffs.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Worker removes a bundle of flats from a truck supplied by floor worker; places on work table and opens it.
 - b. Removes a flat from the stack, inserts one hand into the center, and pulls it open.
 - c. Folds in end flaps.
 - d. With a brush, applies a small amount of glue to the upper side of the end flaps.
 - e. Folds down side flaps, making sure that they meet evenly, thus squaring the box.
 - f. Judging the required length, secures gummed tape from the dispenser and places it over the center seam of the bottom and down each side of the container.
 - g. Stacks containers on truck for removal by floor worker.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Work table, glue pot and brush, and gummed tape dispenser.
 - b. Setup and Maintenance: The worker is expected to reload the gummed tape dispenser and keep its reservoir supplied with water. He is also expected to keep the glue pot replenished.
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants: Substantially the same in all cases. The glue container may be equipped with a wire or other device for removing excess glue from the brush to prevent dripping. Brush may be equipped with a hook, near the base of the handle, for hanging it over the inside edge of the container.

CARTON SETUP

CARTON FORMER (Contd.)

10. Usual Pre-employment Training: None required.
11. Usual Training Procedure on the Job: The supervisor generally instructs the worker in all steps of the operation, making sure he understands the proper method of applying glue and gummed tape.
12. Any Training Deviations Suggested for the Blind:
 - a. The blind worker should be taught the relationship of the taped seam to the printing on the container in order that he may make certain that he is closing the bottom.
 - b. It is also necessary, particularly if the worker is totally blind, to teach him how to drag the brush over the edge of the container, wire or other device, removing excess glue so that only the right amount be applied.
 - c. Special care should be taken to teach a blind worker how to apply gummed tape. One method which has been successfully employed is to place the tape on the edge of one flap first, then bring it down to meet the other flap and smooth out, working from the center out before bringing the tape down the sides of the container.
13. Production:
 - a. Full: 25 to 250 per hour depending upon size of the carton, type of material, and working conditions.
 - b. Time to Reach Normal Efficiency: Two days to four weeks.
14. Interrelation with Preceding and Succeeding Jobs: It is necessary that the containers be square and well sealed in order to facilitate the job of packing them. Must set up a sufficient number of containers to meet requirements of packers.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None

CARTON SETUP

CARTON FORMER (Contd.)17. Sight Requirements and Conditions:a. Vision Required for the Job: Noneb. Conditions Affecting Suitability of a Particular Job:

1. For the Totally Blind: Travel for the securing or disposal of container to be within a limited radius of work area, dependent upon such conditions as noise level, obstructions, other traffic, and ability of the worker. If adhesives are to be applied there must be considerable latitude allowed in the accuracy of its application and no objection to some dripping on the other parts of the package.
2. For the Partially Sighted: Adequate lighting for the type and amount of vision. Reasonable travel for the securing of supplies and disposal of containers.

18. Avoid the Following Conditions: Excessive travel to secure supplies and dispose of material; transfer to other jobs beyond the capacity of a particular worker.

19. Other Jobs Often Combined for Full-Time Employment: See General Information Sheet.

20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

See General Information Sheet.

CARTON SETUP

BOX-BOTTOM STITCHER

1. Name Used for Position in Plant Surveyed: Box-bottom Stitcher
(Corrugated flats known in the trade as regular or special
slotted cartons).

D.O.T. Title: Box Stitcher.

Code: Laborer, Process--Any industry such as canning, 8-04.10

Alternate Titles: Box Sealer; Box-stitcher operator; Box-stitching-machine operator, Carton Maker; Carton Stitcher; Carton-stitching-machine operator; Sealing-stitcher operator; Stitching-machine operator (any industry).

D.O.T. Definition: A Laborer, Process. Fastens cardboard box parts together by means of machine that forces short pieces of wire into the cardboard and crimps them; folds cardboard box along scored lines; inserts edges of box under stitching mechanism of machine; depresses pedal to start machine; stitches edges together by moving box under the stitching mechanism. Sometimes specifically designated according to part of box stitched, as Box-Bottom Stitcher; Box-Corner Stitcher; Box-Side Stitcher.

Items Worked on in Plant Surveyed: Corrugated cartons for shipping
canned goods.

2. Usual Operator:

- a. Sex: Male or female, depending on the size and weight of the carton.
- b. General Characteristics: Any size; better than average physical stamina; agile; average mental ability.

3. Physical Demands:

- a. Activities: Balancing, standing, turning, stooping, reaching, lifting, pushing, pulling, handling, fingering, feeling, working speed.
- b. Working Conditions: Inside; adequate lighting; adequate ventilation; mechanical hazards; working around others.
- c. Skill Required: Unskilled; good orientation within arm's reach; excellent manipulative ability; and ability to accurately judge position of hands in relation to body position.

CARTON SETUP

BOX-BOTTOM STITCHER (Contd.)

4. Details of Physical Activities: Stands all day; balances on one foot while controlling foot pedal with the other; turns body to secure and dispose of cartons; lifts carton flat from truck; handles and fingers it to form body, to fold down flaps, and to keep corners square; stoops slightly; reaches forward below shoulder height to push and pull carton under stapling mechanism; talks with others and listens to determine the action of the stapling machine.
5. Details of Working Conditions: Works inside and around others in adequately lighted and ventilated area; exposed to mechanical hazards from the stapling mechanism.
6. Hazards: Small cuts or lacerations may be received from the edges of the cartons, making it necessary to tape the fingers or wear wrist cuffs until the hands and fingers become toughened to the work. The fingers may be pinched by the action of the stitching mechanism, or a staple may be driven through the finger. This hazard can be reduced to a negligible point through careful systematic instruction of the worker in a method of handling the carton which requires that his fingers always be kept at a safe distance from the stitching mechanism.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Worker secures a carton flat from a truck delivered by a floor worker.
 - b. Using both hands pulls it open, forming the body.
 - c. Sets the carton, top side down, on a small table.
 - d. Folds in end flaps.
 - e. Folds down side flaps, making sure that the edges meet, thus keeping the carton corners square.
 - f. Places carton, bottom side up, over anvil of stitching machine.
 - g. Pushes anvil into position under stitching head.
 - h. Depresses foot pedal to actuate stitching machine.
 - i. While pedal is depressed, moves carton from point to point until a sufficient number of staples have been driven. (Staple should be placed so that the edges of the side and end flaps are securely fastened to each other).
 - j. Removes foot from pedal, thus stopping the stitching machine.
 - k. Pulls anvil from under the stapling mechanism and removes box.
 - l. Places box on adjacent conveyor belt for delivery to the packers.

NOTE: In many plants the stitcher is required to insert bottom and/or side liners as well as assembled nested partitions. This operation is performed on corrugated or cardboard cartons.

CARTON SETUP

BOX-BOTTOM STITCHER (Contd.)8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Stock truck, power stitching machine and conveyor belt.
- b. Setup and Maintenance: The worker is expected to keep the stitching machine supplied with wire. All major repairs and adjustments are made by the regular maintenance man.
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Essentially the same in all cases. The finished containers may be loaded on to a truck, placed on a table, or stacked on the floor if there is no conveyor belt to take them away. The anvil of the stitching machine may either swing into or slide into position under the stapling head.

10. Usual Pre-employment Training: None11. Usual Training Procedure on the Job: Supervisor instructs worker in all steps of the operation.12. Any Training Deviations Suggested for the Blind: The worker should be taught to judge the position of the seam of the box in relation to the printing on it in order that he may be sure he is closing the proper end. It would be well to provide time for a few days' practice prior to placement so that the new worker may become accustomed to moving the box rapidly from one position to the next. During this period he should be taught a definite safety pattern for operating the machine.13. Production:

- a. Full: There is a wide difference in production figures because of the fact that a different number of staples are placed in different boxes depending upon the size of the box and the weight and type of material it is to hold.
- b. Time to Reach Normal Efficiency: One to four weeks.

CARTON SETUP

BOX-BOTTOM STITCHER (Contd.)

14. Interrelation with Preceding and Succeeding Jobs: Sufficient cartons must be supplied to meet the demands of the packers.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel to secure and dispose of material. No requirement for exact positioning of staples.
 2. For the Partially Sighted: Travel requirements and lighting conditions in keeping with the worker's type and amount of vision.
18. Avoid the Following Conditions: Excessive travel to secure and dispose of material. Transfer to other jobs not practical for performance without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: See General Information Sheet.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Canning and preserving, breweries, hardware, heavy electrical appliances, and general manufacturing where the items to be shipped are of a heavy nature.

CARTON SETUP

CARTON SETUP

1. Name Used for Position in Plant Surveyed: Carton setup (novelty lock, cardboard, setup carton).

D.O.T. Title: Box Maker, Cardboard II

Code: Laborer, Process--Any industry, such as dairy, 8-06.51

Alternate Titles: See General Information Sheet.

D.O.T. Definition: See General Information Sheet.

Items Worked on in Plant Surveyed: One-pint cartons (waxed) for ice cream.

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Small to medium size, agile, small to medium size hands.

3. Physical Demands:

a. Activities: Standing, turning, reaching, pushing, handling, fingering, feeling, talking, hearing, working speed.

b. Working Conditions: Inside, cold, damp, adequate lighting, adequate ventilation, working around others.

c. Skill Required: Unskilled; good orientation within arm's reach, better than average manual and finger dexterity.

4. Details of Physical Activities: Must stand all day and work rapidly with hands and fingers.

5. Details of Working Conditions: Works around others in adequately lighted and ventilated area; cold, damp working conditions encountered in such industries as dairies, ice cream, and frozen food; in other industries such as bakeries, drugs, toys, and general manufacturing, this job is usually performed under comfortable conditions.

CARTON SETUP

CARTON SETUP (Contd.)

6. Hazards: There are usually no hazards except that the edges of the cartons may cause small cuts or lacerations, making it necessary for the worker to tape the fingers or wear wrist cuffs until the hands and fingers become toughened to the work.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. The worker secures a stack of twenty-five or thirty cartons from the supply table behind her and places them under her left arm. (These cartons have been placed on the supply table by a floor worker.)
 - b. Taking one carton at a time, she inserts one hand and opens it, forming the body.
 - c. Using the fingers of both hands, folds in the two side flaps at the bottom end.
 - d. Folds down the remaining two flaps, inserting the lock of one into the eye of the other, thus closing the bottom.
 - e. Places carton, open end up, in chute ahead of her for delivery to the filler operator.

NOTE: Although the procedure in this description is typical, it is not universal. Many novelty lock cartons have two locks made in such a manner that two locks feed into two eyes to complete the closure. This is particularly true of cartons used by the bakery industry. Also cartons are waxed or plain depending upon the items with which they are to be filled. This type of carton comes in a wide variety of sizes.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Stock table and metal chute.
 - b. Setup and Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants: Instead of the metal chute there may be a conveyor belt to carry away the setup cartons, or they may be stacked on a work table.
10. Usual Pre-employment Training: None

CARTON SETUP

CARTON SETUP (Contd.)

11. Usual Training Procedure on the Job: Supervisor instructs new worker in all steps of the job.
12. Any Training Deviations Suggested for the Blind: The worker should be taught to judge the relation of the box seam to the printing on the cartons in order that she may be certain to close the proper end.
13. Production:
 - a. Full: 500 to 700 an hour.
 - b. Time to Reach Normal Efficiency: Two days to three weeks.
14. Interrelation with Preceding and Succeeding Jobs: Reduced production will result if sufficient cartons are not supplied to the fillers.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel to secure material.
 2. For the Partially Sighted: No excessive travel; adequate lighting for the type and amount of vision. The degree of lighting should be approved by an ophthalmologist as being compatible with the eye condition of the client.
18. Avoid the Following Conditions: Transfer to other jobs which are not practical for performance without the use of sight. Particularly in small plants workers are frequently required to shift to other jobs, and care should be taken to thoroughly investigate this condition prior to placement.

CARTON SETUP

CARTON SETUP (Contd.)

19. Other Jobs Often Combined for Full-Time Employment: See General Information Sheet.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:
Dairy, frozen food, toy, ice cream, baking, and general manufacturing.

CARTON SETUP

SETUP GIRL

1. Name Used for Position in Plant Surveyed: Setup girl. (Tuck and setup cartons, cardboard.)

D.O.T. Title: Box-Maker - Cardboard II.

Code: Laborer, Process, any industry, such as Drug Industry,
8-53.01.

Alternate Title: See General Information Sheet.

D.O.T. Definition: See General Information Sheet.

Items Worked on in Plant Surveyed: Tuck-end, setup cartons
(cardboard).

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Small or medium sized young girls preferred; nimble, alert.

3. Physical Demands:

a. Activities: Standing, turning, reaching, pushing, pulling, handling, fingering, feeling, talking, hearing, working speed.

b. Working Conditions: Inside, adequate lighting, adequate ventilation, working with others.

c. Skill Required: Ability to work rapidly with fingers, hands and arms all day, to quickly locate by touch parts of box such as corner seams, lightly scored lines and slots. Good orientation within arm's reach to locate flats and to place set-up cartons in correct disposal position.

4. Details of Physical Activities: Stands all day, turns body when securing carton flats, reaches to pick up cartons, uses hands, fingers and arms rapidly to set up cartons and pushes them to the opposite side of table for use by the packers.

CARTON SETUP

SETUP GIRL (Contd.)

5. Details of Working Conditions: Works around others in adequately lighted and ventilated area.
6. Hazards: There are no particular hazards except that the edges of the cardboard may cause small lacerations, making it necessary to tape the fingers until they become toughened to the work.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Operator reaches to the right and secures ten or fifteen carton flats from stock table (these are supplied by a floor worker).
 - b. Inserts fingers into the carton and pulls it open, forming the body.
 - c. Folds down the two short side flaps.
 - d. Folds third flap along scored line near the end, making a tongue.
 - e. Brings down third flap and tucks tongue into box, thus closing the bottom.
 - f. Pushes carton to opposite side of table so that it may be within convenient reach of the packer.

NOTE: In some plants, the worker places the made up cartons on a conveyor belt which delivers them to the packer.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Stock table and work table.
 - b. Setup and Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all cases.
10. Usual Pre-employment Training: None

CARTON SETUP

SETUP GIRL (Contd.)

11. Usual Training Procedure on the Job: Supervisor instructs the worker in all steps of the operation.
12. Any Training Deviations Suggested for the Blind: A blind person must be taught to recognize the seam in the box in order that she may judge it in relation to the printing on the carton, thus making it possible for her to close the proper end.
13. Production:
 - a. Full: 400 to 800 per hour depending on the size of the carton and the weight of the cardboard.
 - b. Time to Reach Normal Efficiency: Two days to three weeks.
14. Interrelation with Preceding and Succeeding Jobs: If the worker does not set up enough cartons to supply the requirements of the packer, production will be decreased or it will be necessary to bring in additional setup girls, thus increasing the costs.
15. Teaming with Other Workers: None.
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel to secure material.
 2. For the Partially Sighted: Any travel to secure material must be in keeping with the type and amount of vision of the worker.
18. Avoid the Following Conditions: Interchange with other jobs on the production line which cannot be performed without the use of sight.

CARTON SETUP

SETUP GIRL (Contd.)

19. Other Jobs Often Combined for Full-Time Employment: See
General Information Sheet.
20. Industries, Parts of Industries or Types of Plants Where This
Type of Job is Frequently Found:
Drug (manufacturing or distribution), cosmetic, plumbing,
clock, small electric appliances, toys, office supplies,
dairies and baking.

CARTON SETUP

BOX FOLDER

1. Name Used for Position in Plant Surveyed: Box folder (Corner lock, folding cardboard).
D.O.T. Title: Box Maker, Cardboard II
Code: Laborer, Process--Any industry, such as laundry, 9-57.21.
Alternate Titles See General Information Sheet.
D.O.T. Definition: See General Information Sheet.
Items Worked on in Plants Surveyed: Shirt boxes - cardboard.
2. Usual Operator:
 - a. Sex: Female
 - b. General Characteristics: Small or medium size, good manual dexterity and coordination.
3. Physical Demands:
 - a. Activities: Standing, turning, reaching, pushing, handling, feeling, talking, working speed.
 - b. Working Conditions: Inside, adequate lighting, adequate ventilation, working around others.
 - c. Skill Required: Unskilled - Good finger dexterity.
4. Details of Physical Activities: The workers stand all day; must have sufficient strength to carry a bundle of carton blanks varying in weight from one to twenty pounds, depending on the size of the carton in the industry in which it is used, from a nearby bin or adjacent truck to the work table; must have good orientation in order that setup cartons may be stacked neatly ready for removal, and must be able to maintain a high rate of speed all day.
5. Details of Working Conditions: The work is usually performed in a large well-lighted, well-ventilated room. Depending upon the industry, other working conditions vary considerably. For instance, in a meat packing house the temperature is usually low, while in a laundry high humidity will be experienced. The work is usually done at a group work table.

CARTON SETUP

BOX FOLDER (Contd.)

6. Hazards: There are no particular hazards except that the edges of the cardboard may cause small lacerations, making it necessary to wear wrist cuffs or to tape the fingers, particularly until the hands become accustomed to the work.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Worker secures stack of cardboard box blanks from nearby bin and places them on the work table.
 - b. Working with a small stack as a unit, bends up all four sides of the boxes as well as all locks. (The blanks are scored along the edges to be bent.)
 - c. Locks all four corners of each blank by inserting the lock of one side into the eye of the adjacent side.
 - d. Nests boxes together in stacks of approximately twenty-five each.
 - e. Pushes stack down the work table to the next worker who sets up the covers and places them on the boxes.

NOTE: This procedure is typical but not universal because the box blanks of different manufacturers may require different assembly procedure. In some plants the worker sets up the entire box. These boxes are then placed in stacks varying in height from 5' to 12'. The cardboard blanks come in a wide variety of thicknesses. Furthermore, it will frequently be found that cartons are designed in such a manner that a single interlocking at either end will form the bottom. (These are known as end block cartons.)

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Work table only.
 - b. Setup and Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all cases.
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: Supervisor instructs new worker in all steps of the operation.

CARTON SETUP

BOX FOLDER (Contd.)

12. Training Deviations Suggested for the Blind: None.
13. Production:
 - a. Full: 150 to 500 per hour depending upon size of carton, type of material, speed of the worker, and working conditions.
 - b. Time to Reach Normal Efficiency: One to three weeks, depending upon previous training, experience, and ability of the worker.
14. Interrelation with Preceding and Succeeding Jobs: Group of workers setting up the cartons must supply a sufficient number to meet the demands of the packers.
15. Teaming with Other Workers: The production speed of the girl setting up the bottoms should be equal to or greater than that of her team mate who is setting up the lids. Otherwise, the efficiency of the team will be greatly reduced.
16. Modification, Deviation, Special Tools for the Blind: None.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: Must not be expected to travel a great distance to secure box blanks or to place completed boxes in high stacks without side supports.
 2. For the Partially Sighted: No special conditions. Adequate lighting for type and amount of vision. The degree of lifting should be approved by an ophthalmologist as being compatible with the eye condition of the client.
18. Avoid the Following Conditions: Excessive travel, transfer to other jobs not practical for performance without the use of sight.

CARTON SETUP

BOX FOLDER (Contd.)

19. Other Jobs Often Combined for Full-Time Employment: See General Information Sheet.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

This operation may be found in industries such as laundry, clothing, meat packing and baking.

CARTON SETUP

CARTON FORMER

1. Name Used for Position in Plant Surveyed: Carton Former (nest type tuck end cardboard).
D.O.T. Title: Box Maker, Cardboard II
Code: Laborer, Process, any industry such as baking products--8-02.10.
Alternate Titles: See General Information Sheet.
D.O.T. Definition: See General Information Sheet.
Items Worked on in Plant Surveyed: Light cardboard, nest type container for cookies, known as "Forty-Count Carton."
2. Usual Operator:
 - a. Sex: Female
 - b. General Characteristics: Small or medium size; young person usually preferred; quick, nimble.
3. Physical Demands:
 - a. Activities: Standing, turning, reaching, lifting, pushing, handling, fingering, feeling, talking, hearing, working speed.
 - b. Working Conditions: Inside, adequate lighting and ventilation; working around others.
 - c. Skill Required: Unskilled. Ability to work rapidly with fingers, hands and arms all day. Good orientation within arms reach to locate carton flats and to place setup cartons in correct disposal position. Ability to quickly locate and identify by touch such parts of the carton as light scoring, seams and flaps.
4. Details of Physical Activities: Stands all day at work; uses hands and arms rapidly; stacking of cartons requires good orientation; determination by hearing when stack has been removed by other worker.
5. Details of Working Conditions: Room clean and maintained at comfortable temperature; close proximity of other workers requires care not to interfere with them.

CARTON SETUP

CARTON FORMER (Contd.)

6. Hazards: No hazards involved. Cardboard edges may cause small lacerations to hands or wrists, requiring taping of fingers and wearing of wrist cuffs.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Operator secures flat carton with one hand from stock pile placed on table by stock chaser, and inserts other hand into carton.
 - b. Pushes carton over to open it.
 - c. Using both hands simultaneously, tucks in end flaps.
 - d. Using fingers of both hands at the same time, breaks through score marks and depresses flaps into proper position to form nest for cookies.
 - e. Places carton on stack on opposite edge of table, to be removed by conveyor feeder.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Group work table only.
 - b. Setup and Maintenance: None
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:
Substantially the same in all cases.
10. Usual Pre-employment Training: None required.
11. Usual Training Procedure on the Job: Supervisor instructs new worker in each step of the operation, emphasizing correct finger manipulation and coordination and supervises practice.
12. Training Deviations Suggested for the Blind: None
13. Production:
 - a. Full: 250 per hour in plant surveyed.
 - b. Time to Reach Normal Efficiency: One to three weeks.

CARTON SETUP

CARTON FORMER (Contd.)

14. Interrelation with Preceding and Succeeding Jobs: Group of workers setting up cartons must keep a sufficient supply for the requirements of the packing line.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None.
 - b. Conditions Affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel for the securing of supplies or disposal of product.
 2. For the Partially Sighted: Adequate lighting for the type and amount of vision.
18. Avoid the Following Conditions: Excessive travel; interchange with sighted workers on other jobs on the production line not feasible for performance without the use of sight.
19. Other Jobs Often Combined for Full-time Employment: See General Information Sheet.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

This job may be found in similar form in the confectionery and other industries.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D. C.

April 22, 1949

REHABILITATION SERVICE SERIES NUMBER 58 - SUPPLEMENT 4

To: Divisions of Vocational Rehabilitation (in States with no separate Agency for the Blind); Commissions and Other Agencies for the Blind

Subject: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category GC-2, Wrapping and Packaging

The attached material on the Wrapping and Packaging category is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as the second category in Part II, General Coverage Series. It describes a few of the jobs in this category and is not intended to be all inclusive of all possibilities for blind workers. Like the jobs described in the first issue, those in this category have been observed and tested by a blind member of the staff of the Division of Services to the Blind.

Other categories of job specifications are being prepared and will be forwarded to you at an early date. Additional copies of the Handbook or any of its supplements will be furnished upon request. We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

Donald H. Dabelstein
Donald H. Dabelstein
ASSISTANT DIRECTOR

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

GENERAL COVERAGE SERIES

Category GC-2

WRAPPING AND PACKAGING

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The above list only partially represents the employment opportunities for blind persons in this category, and specifications for others will be issued as circumstances permit. Additional jobs such as the following should be sought, and all jobs must be carefully analyzed for suitability under the conditions found in a particular plant:

Estimating Weights (bulk items up to two pounds)

Packing Small Packages into Large Containers

Wrapping Unit Lot Packages

Wrapping Bolts of Cloth

Crating Medium and Small Items (machinery, stoves, etc.)

Packing Fruit and Vegetables (following grader and sizer)

Bundle Tying

HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

GENERAL COVERAGE SERIES

WRAPPING AND PACKAGING

General Information SheetD.O.T. Alternate Titles:

- a. Wrapper (I) (any industry) binder; bundle wrapper; bundler; package wrapper; packer; paper hand; paperer.
- b. Crater (III) (any industry) boxer. A Box Maker, Wood III.
- c. Packer (any industry) (I) Filling Machine Operator (I); bagger; packer, packer machine operator; packer man; packing-machine operator; sack filler; sacker, sealer-packer; spout filler; spout puller.

Description of Job Category: In general this category deals with the preparation of finished items, small or medium size, for shipment to the customer bundled or in container. It includes wrapping one or more items in materials such as paper, cellophane, or padding; placing one or more articles into a container such as an envelope, carton, box, crate, tube or jar; tying a number of items into a bundle with or without additional covering. These jobs may include setting up or assembling the carton, box or crate. Jobs in this category are essentially hand operations.

D.O.T. Definitions for:

- a. Wrapper I (any industry) A Laborer. Wraps packages or finished products of an establishment, making a neat, durable bundle; secures package with twine, ribbon, gummed tape, or paste. May currently inspect articles before wrapping for defect, size, color, number, or other items. May segregate articles according to size or type, or according to customers' orders.

WRAPPING AND PACKAGING

General Information Sheet (Contd.)

- b. Crater III (any industry) boxer. A Box Maker, Wood III, who builds wooden boxes or crates and packs finished products in the completed box or crate, reference, Packer III. May wrap and pad the products with excelsior or other packing material. May build crate around the objects of odd shapes. May be specifically designated according to product crated, as Machinery Crater; Refrigerator Crater.
- c. Packer (any industry) (I) Filling Machine Operator (I) (any industry). Fills sacks or bags, or other containers with loose material, such as flour, sugar, or cement, using a machine that automatically fills the container with the desired weight of material; encircles filling spout of machine with neck of container; (1) trips a lever causing material to flow into spout until scale mechanism in spout automatically stops flow of material and then pulls a slide in lower end of spout to drop material into container, or (2) pulls a slide in spout to cause material to flow directly into container until scale platform on which container rests automatically actuates a mechanism stopping flow of material; places filled container aside for removal or places it on a conveyor; periodically checks accuracy of weighing mechanism by weighing a filled container on a test scale. May adjust weighing mechanism and keep such records as the number or weights of containers filled. This category also includes packing of liquids.

Characteristics of Usual Worker: Women and girls are employed in packaging small and light weight articles (weighing up to approximately 10 lbs.) If heavy weights are to be lifted, or medium weights are to be handled rapidly, entailing considerable physical exertion, men or boys are employed. Wherever rapid, dexterous handling is required, younger persons are usually preferred. Workers are the type suited for light physical work and accustomed to medium or low wages.

Physical Requirements, Aptitudes, and Abilities: These jobs require good orientation and dexterity both in finger and arm movements. A good sense of tactual perception may be necessary where inspection is required. Often the worker must maintain a constant, rapid pace

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for significant periods of time, requiring considerable physical and nervous energy. Handling heavy boxes and cartons may require considerable physical strength and ability to lift properly. In some cases the worker must have ability to count and keep track of quantities of articles to be packed together.

Training and Preparation Procedures: The worker is given primary instruction by the Supervisor on the job and allowed practice time, from one day to several weeks, depending on the nature of the job, before being expected to reach normal efficiency. A worker entirely new to Wrapping and Packaging may be started on a comparatively simple type of work detached from a production line and later advanced to more complicated positions. When an experienced worker has developed a special technique it may be beneficially taught the new worker.

Safety Precautions, Health Conditions, Hazards: Operations in this category present no hazards except where the job includes machine operation such as for filling, tying, or wrapping. Safety conditions will vary widely. Each position must be carefully analyzed before being pronounced suitable for a blind worker. In some jobs, the worker's hands must become toughened against the wear and small cuts from the articles or cartons being handled. Taping fingers, wearing gloves or wrist cuffs may be necessary. Where heavy items are being handled, the worker must be careful to lift and set down properly to avoid straining, or bruising of fingers and toes. Health conditions will vary according to the industry but are usually good. Jobs in this category are generally found in the cleaner, healthier parts of the plant. Packaging powdered materials may subject the worker to dusty conditions.

Industries Where This Category is Frequently Found: Jobs in this category are found in almost any industry making small or medium-sized articles. Packaging small finished articles, components, or accessories often includes counting operations. Packaging in wooden crates is frequently found in plants making such items as stoves, machinery and furniture. Jobs will be found in plants making loose items such as cement, powdered paints, sugar and flour; metal, wooden and plastic articles; food stuffs; drugs and sundries, as well as in service industries. It is intended to describe here jobs in which

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the action, type of equipment used, and other conditions are similar in many industries and where experience in one industry may qualify the worker for employment in another. Therefore, when surveying any plant, it should be carefully checked for jobs in this category.

Jobs Usually to be Avoided Although Seemingly Suitable:

Packing positions where visual inspection is included must be avoided for a blind worker. Where color determination is the only visual job requirement, some types of partial sight may be adequate. All positions must be carefully checked for the selection and securing of materials and products. Operations involving the application of glue and other adhesives with a brush, must often be avoided for a totally blind person. Checking an assortment according to varying individual orders will preclude proper performance of some jobs in this category. Avoid positions where serial numbers, grade codes, order and model numbers, colors, sizes, etc. must be noted and/or compared with orders or stock lists. Where weighing is required the job must be avoided unless the scales may be read by tactual or aural perception.

Combination Jobs: Job combinations are machine loading and off-bearing, non-visual inspection, final assembly, carton set-up or trucking. Several of these operations may be combined to be the continuous responsibility of an operator, or the operator may change from one to another at stated intervals in order to relieve nervous tension and fatigue.

WRAPPING AND PACKAGING

PACKER, SMALL PARTS1. Name Used for Position in Plant Surveyed: Packer, small partsD.O.T. Title: Packer IICode: 8-94.65Alternate Titles: Boxer, carton boxer, container packer, crater, package packer, packing clerk, packman.D.O.T. Definition: (A Laborer or a Laborer Process)

Packs finished and wrapped products of an establishment in cardboard or wooden boxes, cartons, kegs, or other containers preparatory to shipment or storage; neatly folds, stacks, or otherwise arranges the articles in the container, using excelsior, wastepaper, or other material as necessary to prevent breakage or damage. May, while packing, weigh articles and inspect them for size, color, defects, or other items and keep a record of articles packed. May be specifically designated according to article packed.

Items Worked on in Plant Surveyed: Roller chain parts2. Usual Operator:a. Sex: Femaleb. General Characteristics: Any size; quick movements, especially of the fingers and hands; average or less mental ability.3. Physical Demands:a. Activities: Turning, sitting, reaching, lifting, pushing, pulling, handling, fingering, feeling, working speed.b. Working Conditions: Inside, noisy, adequate lighting and ventilation; working around others.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

PACKER, SMALL PARTS (Contd.)

- c. Skill Required: Unskilled; worker must have ability to manipulate small parts and cartons and to locate accurately items within arm's reach; must have at least moderate skill at locating positions on work table in order to dispose of packed cases; must develop skill in judging number of parts being pushed into chute.
4. Details of Physical Activities: Sits all day on stool at work table; reaches to secure handfulls of small parts and to stack filled cases at end or back side of work table; fingers small parts to push them into a spout and to remove excess from small weighing tray; also fingers small cartons to open them up and tuck in flaps; if blind, must feel to detect movement of scale parts, or hear to determine buzz of indicator; pushes and pulls containers weighing five to ten pounds to move them to or from storage position on table.
5. Details of Working Conditions: Works inside in well lighted and well ventilated room; clean surroundings; considerable noise at times caused by operation of adjacent machinery. Other workers will be located in adjacent positions or on opposite side of work table but no coordination with others is required.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed:
- (NOTE - Scales have been adjusted according to procedure shown in Item 8-b, for 20 or 100 items per box as the case may be)
- a. Scoops several handfulls of parts from bucket on table by floor worker and places them in the storage tray located above the right hand platform of the scale.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

PACKER, SMALL PARTS (Contd.)

- b. With the fingers of the right hand, drags parts from storage tray into the spout, which deposits them in the weighing tray on the platform. An intermittent buzz indicates that approximately the right number of parts have been deposited. When the buzzing becomes steady, there is at least one extra piece in the tray.
- c. Removes pieces one at a time from the weighing tray until the buzzing ceases, at which point it will contain the correct number of parts.
- d. Secures small carton from stack on the table, opens it, tucks in the bottom, empties the content of the weighing tray into it and closes the carton.
- e. In the case of the 20-piece boxes, they are packed into a larger carton which will hold 10 of them; when this container is full, closes it and stacks it at the left hand end of the table for removal by floor worker. In the case of the 100-piece boxes, they are not packed in a carton but stacked directly on the table when filling is completed.

NOTE: In some cases the balance scales are not equipped with buzzers, in which event the motion may be detected by placing fingers of the left hand at the point where the moving end under the left hand platform normally rests on the base casting of the scale. When the correct number of pieces have been deposited in the weighing scale, the fingers will detect the moving part of the scale rising to a higher position, and will judge whether the distance it has risen indicates the exact weight, or over-weight. The sighted operator determines whether the scale is in exact balance by observing the position of the pointer. If this pointer is not enclosed, it may be tactually observed by a blind worker.

In some instances the workers count the parts directly without the use of the scale, much in the manner in which coins are counted.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

PACKER, SMALL PARTS (Contd.)8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Detectogram balance scale, range up to 3 lbs. with enclosed indicating pointer; storage tray with spout leading out of front left corner, mounted approximately 3" above right hand platform of scale; small weighing tray; small balance tray and supply of small shot; flat top work table. In the plant surveyed, the balance was equipped with electric buzzer described in Item 16.
- b. Set-up and Maintenance: Plant mechanic locates balance scale on table; connects up buzzer indicator and maintains working condition of apparatus. Worker sets balance for a given quantity of any particular part being packed. This is accomplished by counting into the weighing tray the desired number of the particular part and placing this load on the right hand platform. Small shot are then deposited in the balance tray located on the left hand platform until the scales come to a condition of balance.
- c. Modification: Where determination of balance is to be made by sound, an electric buzzer and contacts are installed. A small wooden block carrying a copper plate is clamped to the right hand portion of the frame of balance; a light spring contact is clamped to the moving part and so adjusted as to make contact with the copper plate after the right hand platform has passed below the balance point. The circuit is then wired to a buzzer and batteries. In the plant surveyed, this modification was made in not over two hours at a cost of approximately \$3.00 for parts. Since contact is made only after the platform, on which the tray is being weighed, has moved below the balance point, the sensitivity and accuracy of scale is not affected. When it is desired to read the pointer by feeling its position, it will be necessary with some scales, to remove the glass cover from the pointer housing.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

PACKER, SMALL PARTS (Contd.)

9. Equipment Variations Which May be Found in Other Plants:
In some cases where sufficiently heavy items are being weighed, the operator may prefer to determine the balance of the scale by following the motion of the mechanism at a point where the platform supports move up and down in the frame of the balance. In some cases the platform scales may be used and the reading will then be determined by the motion of a beam. Some special counting scales can be so arranged that a number of similar parts are placed in a container on the scale and these will balance an equal or greater number of parts placed on the weighing platform. This ratio may range from one to one or as high as 100 to one. The action of these scales must usually be observed by following the motion of the end of the beam arm.
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: The worker is given primary instruction by the foreman, immediate supervisor, or special plant training official. Additional coaching on the job will be given by the same persons and in some cases adjacent experienced workers will make helpful suggestions.
12. Any Training Deviations Suggested for the Blind: In some cases it may be necessary to point out how the printing on the box relates to the position of the seam.
13. Production:
- a. Full: In various plants the production will be affected by the type of cartons, disposition of packages and securing of materials. In plant surveyed production rate was 20-piece boxes, 70 per hour; 100-piece boxes, 44 per hour.
- b. Time to Reach Normal Efficiency: Three to four weeks in plant surveyed.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

PACKER, SMALL PARTS (Contd.)

14. Interrelation with Preceding and Succeeding Jobs: Usually there is no direct interrelation with other jobs or other workers; daily production must keep pace with plant production.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind:
Modification in the plant surveyed is indicated in Item 8-c (electrical buzzer). Similar sound indicators may be found desirable for sighted workers to relieve the monotony of watching the movement of the pointer or to give the supervisor a method of inconspicuously checking on the work being done. The need for and the type, extent, and cost of modification of counting scales will vary with the type of scales and duty performed.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel to secure parts or supplies; no reading or recording of orders; no visual inspection; counting scales must have suitable points of observation of balance or be equipped with an audible indicator.
 2. For the Partially Sighted: Conditions of illumination, travel and inspection must be compatible with eye condition. Tactual observation of balances is usually preferable, while lamp indicator may be acceptable in some cases.
18. Avoid the Following Conditions: Visual inspection; excessive travel for parts or supplies; the tallying, checking or filling out of orders or production records.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

PACKER, SMALL PARTS (Contd.)

19. Other Jobs Often Combined for Full Time Employment: Carton set-up; filling or wrapping machine operation; hand counting; wrapping and packaging.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

This job is most frequently found in plants making small parts which are packaged and sold by number. Such items are bolts, nuts, lag screws, springs, bushings, small machine parts and stampings. Frequently these plants are listed as bolt and nut, screw machine, metal stampings, or metal products. In some plants where the major packing and carton filling is done by machine, the hand cutting or weight counting may be used to fill special or short orders for which it is not profitable to set up a machine.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

FOLDER AND TIER

1. Name Used for Position in Plant Surveyed: Folder and Tier

D.O.T. Title: Folder I

Code: 9-63.41

Alternate Titles: None

D.O.T. Definition: Packer (II) who neatly folds articles
(usually items of clothing) before packing.

Items Worked on in Plant Surveyed: Cloth napkins

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Young girls preferred; for
napkins girls of any size; for folded tablecloths
tall girls have an advantage because of reaching;
workers should have quick, agile movements of
fingers, hands and arms; type of worker suited to
continuous, rapid, monotonous light work; no
special mental ability.

3. Physical Demands:

a. Activities: Turning, sitting, reaching, lifting, pushing,
pulling, handling, fingering, feeling, working speed.

b. Working Conditions: Inside, noisy, adequate lighting and
ventilation, working around others.

c. Skill Required: Unskilled; worker needs deftness at
finger manipulation of string or light tape; good
orientation within arm's reach; should be skilful
at interpreting and determining information obtained
by tactual perception.

4. Details of Physical Activities: Sits all day at work table;
turns to left or right to obtain or dispose of stacks of
finished products which are pushed or pulled along the

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

FOLDER AND TIER (Contd.)

table; may have to reach three to four feet to obtain stack of product; when picking up napkins in lots of a dozen, must feel to determine that entire amount has been obtained; must work rapidly, accurately, and have good orientation so that stacks of napkins will not be upset.

5. Details of Working Conditions: Works inside in a well lighted and ventilated room with other workers at adjacent positions at the table; noisy because of a number of power sewing machines operating in the same room.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed:
 - a. From supply space at left end of table obtains stack of ten or more dozen lots of napkins and pulls it over to convenient work position.
 - b. With left hand places a dozen lot on the table immediately in front of her, while with the right hand obtains end of tying tape.
 - c. Passes tape around lot in two directions, tying with a single bow knot, and cuts off tape with a pair of scissors.
 - d. Places tied lot on stack to the right, alternating the direction of the long dimension of each lot. When the entire stack has been tied, pushes it along the table into the supply area for the bundler, being careful not to knock over the other stacks already in the area.

NOTE: Square napkins are folded to half dimension one way and third dimension the other, resulting in a folded dimension approximately 8 x 12 inches. They are grouped in lots of a dozen, which are then cross-stacked in order to retain the identity of each lot. Stacks must be built uniformly so that they will not fall over easily.

Care must be exercised to have tape wrapped snugly around the lot but not tight enough to distort it.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

FOLDER AND TIER (Contd.)

8. Equipment as Found in the Particular Plant Surveyed:
- Identification: Work table; scissors; holder for spool of tape.
 - Set-up and Maintenance: None; floor worker will place new spool of tape in position when required.
 - Modification: None
9. Equipment Variations Which May be Found in Other Plants: Substantially the same in all plants.
10. Usual Pre-employment Training: None; however, any type of factory work experience is advantageous.
11. Usual Training Procedure on the Job: New worker is instructed by immediate supervisor or special training officer; follow-up coaching and suggestions as to special short-cuts are often supplied by adjacent fellow-worker.
12. Any Training Deviations Suggested for the Blind: None
13. Production:
- Full: 150 dozen per hour.
 - Time to Reach Normal Efficiency: Three weeks.
14. Interrelation with Preceding and Succeeding Jobs: Supply space on table allows storage of only enough napkins for a short run; worker must keep up with pace set by folders or cause congestion and reduction in output of entire line.
15. Teaming with Other Workers: No direct teaming, but care in placing stack of tied napkins in supply area facilitates work of succeeding operator.
16. Modification, Deviation, Special Tools for the Blind: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

FOLDER AND TIER (Contd.)17. Sight Requirements and Conditions:

- a. Vision Required for the Job: None
- b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: No inspection; no travel to obtain products or supplies.
 2. For the Partially Sighted: Travel and lighting conditions, color determination, and inspection required, must be compatible with the type and amount of vision of the worker.

18. Avoid the Following Conditions: Situations where tier is required to sort and place into stacks according to weave pattern.19. Other Jobs Often Combined for Full Time Employment: Folding, building, tying, straightening, folding of table-cloths, and wrapping.20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Cloth mills doing weaving; finishing mills; processors of cloth; linen supply factories.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

COUNTING MACHINE OPERATOR

1. Name Used for Position in Plant Surveyed: Counting Machine Operator.

D.O.T. Title: Packer II (any industry)

Code: 8-93.07

Alternate Titles: Boxer, carton boxer; container packer; crater package packer; packing clerk; packman.

D.O.T. Definition: Packs finished and wrapped products of an establishment in cardboard or wooden boxes, cartons, kegs, or other containers preparatory to shipment or storage; neatly folds, stacks, or otherwise arranges the articles in the container, using excelsior, waste paper, or other material as necessary to prevent breakage or damage. May, while packing, weigh articles and inspect them for size, color, defects, or other items and keep a record of articles packed. May be specifically designated according to article packed.

Items Worked on in Plant Surveyed: Unprinted crown caps.

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Any size; good manual ability; average or less mental ability; able to withstand noise and vibration.

3. Physical Demands:

a. Activities: Sitting, turning, reaching, lifting, handling, fingering, and feeling.

b. Working Conditions: Inside, dusty, noisy, adequate lighting and ventilation, mechanical hazards, working around others, working alone.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

COUNTING MACHINE OPERATOR (Contd.)

- c. Skill Required: Unskilled; ability to manipulate small cardboard cartons and retain location of machine parts, controls, and boxes within arm's reach.
4. Details of Physical Activities: Sits at operating position in front of machine, turns and reaches to left or right to obtain blank cartons and dispose of filled ones; pushes filled shipping case to one side to make room for an empty one; fingers small cartons to set them up and close them after filling, detecting by feel that the operation has been properly accomplished. Determines own production by speed with which cartons are handled.
5. Details of Working Conditions: Works inside in clean, adequately lighted and ventilated surroundings, around others on fill-in-jobs, but alone on major operations. Location is noisy and there is considerable vibration due to the operation of printing and stamping machines; nearby noises and vibrations pulsating in rhythm are annoying to some workers. Hand trucks move only in the aisles.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed:
 - a. With left hand obtains chip board carton (approximately 2" x 4" x 6"); opens and tucks in bottom.
 - b. With right hand removes filled carton from under filler spout, and with left hand sets an empty in its place. Trips operating lever to start machine, which deposits one gross of caps in the carton and then shuts off.
 - c. Closes top and places in shipping case which will hold 36 of these one-gross cartons.
 - d. When shipping case is filled, closes flaps and pushes it to one side for removal by floor worker. Floor worker removes filled cases, also brings supplies, including set-up shipping cases, and fills machine hopper with caps.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

COUNTING MACHINE OPERATOR (Contd.)8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: The special counting machine (designed and constructed in this particular plant) is motor-driven; loose caps are deposited in a large hopper from which they automatically feed down the filler spout through a counting mechanism; when one gross has passed the counting mechanism, it automatically stops the machine; the only operating control is a lever for starting. Tables. Benches which hold supplies. And the shipping case as it is being filled,
- b. Set-up and Maintenance: Setting up equipment; maintenance and adjustment of the machine are the duties of the plant mechanic.
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Other plants would have their own design or standard machines for this purpose, operating on a similar principle.

10. Usual Pre-employment Training: None11. Usual Training Procedure on the Job: Supervisor explains details to new worker and coaches her as long as required.12. Any Training Deviations Suggested for the Blind: None13. Production:

- a. Full: No check has been made or standard set for production on this machine, since its full daily output is not required and the usual procedure is to use it as a fill-in for extra workers from other jobs.

b. Time to Reach Normal Efficiency: One to two weeks.14. Interrelation with Preceding and Succeeding Jobs: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

COUNTING MACHINE OPERATOR (Contd.)

15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: No travel to obtain supplies or dispose of finished products.
 2. For the Partially Sighted: Lighting and travel conditions must be compatible with the type and amount of vision of the worker.
18. Avoid the Following Conditions: Inspection, tallying, or reading of orders, and also for the totally blind, travel to obtain supplies.
19. Other Jobs Often Combined for Full Time Employment: This job may be combined with many other packaging operations. In the plant surveyed it was combined with the job of removing cork liners from defective caps.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Any industry making small parts which are packaged and sold by number, such as bolts and nuts, tacks, small metal stampings, and screw machine products.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

HOOPER AND NAILER

1. Name used for Position in Plant Surveyed: Hooper and Nailer

D.O.T. Title: Case Strapper

Code: 9-63.41

Alternate Titles: Metal stayer, packing-case strapper, tier, wire-tying-machine operator.

D.O.T. Definition: Ties several small boxes together, or binds packed wooden shipping cases or boxes with wire by means of a hand operated wire-tying machine to reinforce and hold together during shipment; attaches one end of wire in one chuck of machine; wraps wire around stacked boxes or packing case; attaches other end of wire in the other chuck of the machine; pushes hand levers to draw wire tight about case; twists ends together and cuts off excess wire. May fasten covers on boxes (reference, Lidder) and perform other duties as assigned.

Items Worked on in Plant Surveyed: Cardboard and wooden shipping cases filled with finished cloth; cardboard cartons weighing 50 to 320 lbs., wooden boxes from 150 to 425 lbs.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Medium to large size; good physical strength and stamina; average mental ability.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, crouching, reaching, lifting, carrying, pushing, pulling, handling, fingering, feeling, talking, working speed.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

HOOVER AND NAILER (Contd.)

- b. Working Conditions: Inside, noisy, adequate lighting and ventilation, moving objects, cramped quarters, working with others, working around others, working alone.
 - c. Skill Required: Unskilled; sufficient ability with hammer and hatchet to drive nails accurately into edge of one-inch boards; sufficient finger dexterity to properly and quickly thread one-half inch wide thin steel strap material into banding machine and apply clips; sufficient tactual perception to differentiate between thin and thick sheets of paper; ability to judge accurately the placing of boards, nails and bands with respect to the edge of the box; ability to move accurately from one work stand to another and to the stacks of cartons within five or six feet of work line; ability to lift properly.
4. Details of Physical Activities: Walks from one work stand to another, or to stack of boxes near-by; stands, stoops, crouches and reaches to secure lid boards and place them in position on the box, or to close lid of cardboard cartons, and to place metal bands around the container; lifts and carries cartons, placing them on a near-by stack; pushes or pulls large cartons to tumble them off the work stand; fingers metal bands to place them in proper slots in tightening machine and to place clip in position on the bands; fingers packing sheets to know which one to put inside the box before it is lidded and to tuck remaining packing sheet under a band; talks with adjacent worker and cooperates with him when assistance is necessary to handle very large boxes.
5. Details of Working Conditions: Works inside in clean, well ventilated surroundings with only one or two workers near-by; area may be noisy because of hammering by other workers and operation of machinery. Trucks move in aisle adjacent but not through work position; seeks from, or gives assistance to, adjacent worker when a large-size case is to be handled.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

HOOPER AND NAILER (Contd.)

6. Hazards: Worker may hurt his fingers from inaccurate pounding or may strain himself from improper lifting of heavy items. This may be avoided if proper methods of lifting are understood. The worker must be careful to remain in work position between stands in order to avoid collision with moving trucks.
7. Sequence of Steps in Position in Plant Surveyed:

Cardboard cartons and wooden boxes are brought in by truckers and placed on platform in a row on the floor. The platforms are approximately 5" high and the row about 70' long. Room is left between each platform for adequate working space. Each row is completed before the ladder starts working on it.

- a. Opens the lid of the box and removes the heavy copy of the packing sheet, placing it into his pocket. (The tissue copy remains on top of the cloth).
- b. Turns in liners and
- (1) for cardboard cartons, closes flaps, or
 - (2) for wooden boxes, places ready-cut lid boards in position on top of box.
- c. Obtains tightening machine and end of band iron from supply cart, placing the machine on the top of box and passing the band over and around one of the overhanging ends of the box; slips end and the main strand of the band, edgewise, into the proper slots of the tightening machine, moving the fastening lever to secure them in position; operates handles back and forth in a direction parallel to the band, tightening the band until it just begins to sink in at the corners of the box; clip, taken from tray on the supply cart, is placed over the band at the center of the tightening machine; pulls handles toward himself to crimp the clip and secure the band; removes machine to position on the supply cart; grasping the main strand of the band in one hand moves it up and over in such a way as to form

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

HOOPER AND NAILER (Contd.)

a sharp bend at the end of the clip; moves the band back and forth until it breaks off at the end of the clip.

- d. Repeats, placing band on the other overhanging end of the box.
- e. Places two bands around the box crossways from the original banding; the banding iron is passed through tunnels formed by the bottom of the box and channels in the top of the platform.
- f. For wooden boxes, drives nails through end of lid boards into edges of the side boards.
- g. Tips box off platform on to its side on the floor.
In the case of small cartons the ladder may stack them one or two cases high.
- h. Tucks heavy copy of packing sheet under one of the bands.
Box is then removed by trucker.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Platform stands about 5" high for supporting cartons in work position; small two-wheel cart with compartments for holding nails, clips and tools, with reels of banding material mounted on the side; hammer and hatchet; signode hand banding machine for tightening bands and fastening with clips.
- b. Set-up and Maintenance: None required.
- c. Modification: None required.

9. Equipment Variations Which May be Found in Other Plants:

Roller or belt conveyors may be used for bringing the loaded boxes to or taking them away from the work position. Where heavy straps are used the tightening machine may be motor-driven. In some cases wire may be used instead of flat straps. With some model hand machines, it may be necessary to crimp the clip with special separate pliers.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

HOOPER AND NAILER (Contd.)

10. Usual Pre-employment Training: Before going on the job, if wooden cases are to be lidded, the worker should be skilled at driving nails. In any case he should have experience and ability in the use of hand tools.
11. Usual Training Procedure on the Job: Simple instructions as to requirements of the job and any special short-cuts are given by the immediate supervisor or an experienced fellow worker.
12. Any Training Deviations Suggested for the Blind:

None, except that where wooden cases are to be lidded blind workers previously should have developed good skill in driving nails.
13. Production:
 - a. Full: In the plant surveyed, worker averaged 80 wooden cases or 90 cardboard cases closed per day. There will be considerable variation depending upon the size of the cartons, method of conveying, the disposition of any packaging sheets, and the number of straps to be applied.
 - b. Time to Reach Normal Efficiency: In the plant surveyed, the worker was expected to reach normal efficiency within two or three months. In other plants and situations, he may be expected to reach full efficiency in a period as short as one week.
14. Interrelation with Preceding and Succeeding Jobs:

Worker must keep up with the average output of preceding department. When working off a conveyor, there may be little reserve of boxes available, and he may be required to work very rapidly for short periods of heavy flow of boxes. In some cases a slackening of the worker's production would cause a temporary stoppage of the production line.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPER AND PACKAGING

HOOVER AND NAILER (Contd.)

15. Teaming with Other Workers: Where heavy boxes are handled, two adjacent workers may combine their efforts in handling the containers. If the entire production is heavy, they may work regularly as partners. There must be a good mutual understanding of duties and methods in order to maintain production and avoid injuries.
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: Requirements for reading shipping orders or lot numbers, or segregation of containers according to brand labels; no travel beyond work area.
 2. For the Partially Sighted: Adequate lighting; with travel, reading requirements and physical demands compatible with the worker's type and amount of vision and eye condition.
18. Avoid the Following Conditions: For the totally blind, the stacking of medium or large boxes; trucking to or from the work area; sorting where visual identification is necessary. For the partially sighted, extensive travel through heavy traffic conditions; heavy physical exertion or lifting not compatible with eye condition.
19. Other Jobs Often Combined for Full-Time Employment: Trucking and shipping.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Manufacturers of cloth, cut paper, wall board, composition shingles and other articles heavy in proportion to size. Many packages are banded for export shipments which do not require this treatment for rail transportation. In such cases, banding may be done by a forwarding company at the port of shipment.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH JOB SURVEY.

WRAPPING AND PACKAGING

BAG FILLER1. Name Used for Position in Plant Surveyed: Bag FillerD.O.T. Title: Filling Machine Operator (1) (any industry)Code: 7-68.032

Alternate Titles: Bagger; packer; packer-machine operator; packer man; packing machine operator; sack filler; sacker; scaler-packer; spout filler.

D.O.T. Definition: Fills sacks, bags, or other containers with loose material, such as flour, sugar, or cement, using a machine that automatically fills the container with the desired weight of material; encircles filling spout of machine with neck of container; (1) trips a lever causing material to flow into spout until scale mechanism in spout automatically stops flow of material and then pulls a slide in lower end of spout to drop material into container, or (2) pulls a slide in spout to cause material to flow directly into container until scale platform on which container rests automatically actuates a mechanism stopping flow of material; places filled container aside for removal or places it on a conveyor; periodically checks accuracy of weighing mechanism in machine by weighing a filled container on a test scale. May adjust weighing mechanism and keep such records as the number or weights of containers filled.

Items Worked on in Plant Surveyed: Powdered pigment2. Usual Operator:a. Sex: Male

b. General Characteristics: Good stamina and physical strength in hands, arms and shoulders; medium to large size; average mental ability, with an aptitude for the operation of machinery. Colored workers used on this job in the plant surveyed.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

BAG FILLER (Contd.)3. Physical Demands:

- a. Activities: Walking, climbing, crawling, standing, turning, reaching, lifting, carrying, handling, fingering, feeling, talking, hearing.
- b. Working Conditions: Inside, dusty, noisy, adequate lighting and ventilation, mechanical hazards, high places, working with others, working around others.
- c. Skill Required: Unskilled; ability to orient and move accurately within work area of approximately 12 feet; skill at judging the amount of material to add or subtract from a bag in order to trim to the proper weight; ability and habit of lifting properly in order to minimize the degree of fatigue; ability to comprehend difficulties with machinery and act quickly in cases of emergency.

4. Details of Physical Activities: Walks around area approximately 10 x 14 feet; occasionally climbs and crawls to reach parts of the equipment to be cleared; stands in work position, turns and reaches for empty bag and puts bag into position on spout of machine; feels and fingers end of bag to gain proper hold for opening, handles it to slip it over the spout and straighten out the bottom; lifts 50 lb bag from platform, carrying it approximately three steps to the scale, or lifts it from the scale to the conveyor feeding the tying machine, and again from the tying machine conveyor lifts and carries it to platform truck, a distance of from two to five feet; talks with partner to coordinate work and continually listens to equipment to determine its operating condition.

5. Details of Working Conditions: Works inside in dusty, adequately lighted and ventilated surroundings, where there is a constant drumming, pulsating noise of heavy grinding machinery which makes conversation difficult; mechanical hazards from the tying machine which is partially guarded can be avoided by proper procedure. When operating the filling machine, stands on platform about 18" high, so must maintain good orientation to avoid stepping off. Works with a partner, changing off each hour.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

BAG FILLER (Contd.)

and in second position must maintain pace set by partner; hand trucks are working in the area from time to time.

6. Hazards: Operator when working in the first position must exercise care not to step off the platform; in the second position the worker's hands and arms would be seriously hurt if they became entangled in the tying mechanism which is guarded except for the sides where the bag enters and leaves. The worker must be careful to let go of the bag promptly after placing it on the conveyor, but he may safely follow it through the machine if his hand is placed on the bottom of the side of the bag.

7. Sequence of Steps in Position in Plant Surveyed:

Two workers operate as a team, changing off on routine steps each hours. Other activities such as clearing or adjusting equipment, securing supplies, and stamping bags, may be regularly performed by the same worker according to mutual agreement.

The machine is started by pressing buttons on a control located to the right of the operating position. The equipment items are started in a definite sequence, and each is allowed to come up to speed as indicated by sound and vibration before the next unit is started. The sequence is: dust blower, filling machine, short conveyor, grinder, and long feeder conveyor from the storage bin. The entire assembly of equipment may be stopped by the pressing of one button.

- a. Standing in front of the machine, secures bag from table at the right and uses both hands to open it. With a forward and upward motion slips it over the end of the discharge spout, pulling it up almost the entire length of the bag; gathers the top of the bag snugly around the spout where it is held with the right hand while the left hand finishes opening and straightening out the bottom.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

BAG FILLER (Contd.)

(Caution - If the bag is not held snugly around the spout a certain amount of pigment will blow out, causing the package to be underweight. If the bottom is not properly straightened, the bag will only partly fill and have to be set aside for later adjustment).

- b. With the right foot steps on pedal and starts filling operation, also causing the platform to rise up under the bag to take the weight as it is filled. This platform slowly lowers as material is deposited into the bag. When the proper amount of material has been deposited the machine stops, as indicated by change in noise.
- c. Steps on second pedal to lower platform quickly to the floor and, grasping top of the bag with both hands, sets it over to the left onto the platform of the scales. (Sets bag firmly on the scale so it will not upset).
- d. Trims weight of bag to within two ounces, plus or minus, of fifty pounds, by using the hands to remove or add material. (In plant surveyed the scale used gave indications on an enclosed dial).
- e. (Second worker takes over at this step). Grasping the top of the bag with both hands sets it on to the conveyor belt which will carry it through the tying machine. Before releasing the bag, forms the top into a long narrow opening parallel to the direction of travel of the bag so that it will properly enter the gathering mechanism of the tying machine.
- f. After bag has passed through tying machine, lifts it and places it on a near-by platform truck for removal by other workers. A blind operator should follow the progress of the bag through the tying machine by keeping the right hand in contact with the bottom of the side of the bag, and thus be able to remove it promptly after it has cleared the machine.

Second operator utilizes intervals when no bags are being filled, to stamp date and other information on empty bags. Large table adjacent to the operation position is used for this purpose.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

BAG FILLER (Contd.)8. Equipment as Found in the Particular Plant Surveyed

- a. Identification: The main equipment is the Pneumatic Scale Company's large bag-filling machine No. 4573, similar to the flour-packing machine No. 2521. This machine is served by a grinder and storage bin with necessary conveyors and a dust-collecting blower. Motor controls are brought to a push button panel located to the right of the operating position. Also, there are automatic controls at several points to stop machinery if excess material accumulates at those points.

The scale used is the Toledo (enclosed dial type) Dial No. 31-1801.

The tying machine is a Hamer which automatically gathers the top of the bag, encircles it with wire, the ends of which it twists together and fastens. It includes a belt conveyor to carry the bag through the machine. Other equipment includes a work table, stamping bag, platform for holding supply of stamped bags, and bin located to the right of the scales to hold pigment material used in trimming weight of the bag.

- b. Set-up and Maintenance: The major set-up and continuing over-all mechanical and electrical condition of the equipment and its general maintenance is the responsibility of the plant mechanic. As the daily work progresses the condition of the powdered pigment varies slightly in such characteristics as moisture content and grind, which will necessitate the operator making adjustments by turning the crank at the left of the operating position in order to increase or decrease the amount of material deposited in each bag. When feed channels become clogged, resulting in a change of noise or a decrease or shortage of material, it will be necessary for the operator to shut down the equipment, clear out the clogged portion or call a plant mechanic if the difficulty is serious.

- c. Modification: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

BAG FILLER (Contd.)

9. Equipment Variations Which May be Found in Other Plants: The equipment will usually be substantially the same. However, the supply, check-weighing, and tying equipment may vary considerably according to the plant and type of bag being used. Usually some form of continuous feed to the hopper of the machine is provided. The scales will often be of the beam type; in other cases, audible or visible light signals may be used in conjunction with the dial scale. The closing of the bag may be done by hand or in the case of cloth bags by a special sewing machine. In many cases, conveyors are provided for removing the bags.
10. Usual Pre-employment Training: None. The usual procedure is to hire workers in good physical condition who have had previous experience stacking and handling similar material.
11. Usual Training Procedure on the Job: Supervisor explains each step of the operation to the new worker, watches his progress for a while and leaves it for his experienced partner to continue the coaching.
12. Any Training Deviation Suggested for the Blind: The employment counselor should supervise the training of the new blind worker on the job. Two experienced workers should be on the job and the blind worker should take over only one step at a time until he becomes familiar with each one, after which he can take over the entire operation of either position. The employment counselor must have previously become familiar with the alternative methods of observation (used instead of sight) such as noise and vibration and be able to point them out to the blind worker. He should also be sure that a mutually satisfactory and equitable division is made of auxiliary duties such as obtaining supplies, stamping bags, clearing and adjusting equipment.
13. Production:
 - a. Full: The nominal rate is 1600 bags per 8-hour shift.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

BAG FILLER (Contd.)

(120 tons per 24 hours). Actual production records show an average of 106 tons per 24 hours, reduction being caused by conditions beyond the control of the filler operator. (The care with which the filling machine is adjusted and the snugness with which the bag is held in position around the spout contribute to the accuracy of the filling of each bag, thus reducing the amount of trimming necessary and raising the over-all production).

b. Time to Reach Normal Efficiency: Three weeks.

14. Interrelation with Preceding and Succeeding Jobs: None. The 24-hour production must keep pace with the manufacturing production of the plant. The storage hoppers allow sufficient leeway for short shut-downs without disrupting the manufacturing process.
15. Teaming with Other Workers: The worker on the first position of this job sets the pace and the second worker must keep bags cleared away. The division of auxiliary duties between the operators should be made in such a way as to give the best over-all efficiency and be suitable and equitable.
16. Modification, Deviation, Special Tools for the Blind: Usually there will be no modification required except in the case of the enclosed dial scale where the addition of equipment to give an audible indication will be required. Where this type of scale is already supplemented with light indicators, buzzers can be easily installed parallel with the lights. For the type found in the plant surveyed the manufacturer of the scale also can provide, as stock items, equipment for giving audible indication of the reading. The cost will be equal to approximately one-half the cost of the scale itself. This equipment is used by some companies in the case of their regular sighted workers, to give an audible signal for the benefit of the worker and as a suitable indication to the supervisor of how

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

BAG FILLER (Contd.)

the work is progressing. In cases where the value per pound of the material is high, the extra cost may be justified by the increased accuracy in weighing.

17. Sight Requirements and Conditions:

- a. Vision Required for the Job: None when teaming with sighted worker.
- b. Conditions Affecting Suitability of a Particular Job:

1. For the Totally Blind: The type of weighing equipment, the closeness of the tolerance and the frequency with which the packaging must be check-weighed will determine whether a totally blind person could operate the job. There should be no trucking for disposal of products; no requirements for determining brand labels on the package, tallying orders or lot numbers.
2. For the Partially Sighted: The amount of reading of orders, brands and scales; the degree of lifting; and the lighting conditions must be compatible with the degree and type of vision and the eye condition of the worker.

18. Avoid the Following Conditions: Situations requiring trucking or long travel to secure supplies, or operation of the job without a sighted partner.
19. Other Jobs Often Combined for Full Time Employment: Trucking, warehouse stacking, other packaging operations, shipping.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Flour and feed mills, seed companies, cement and sugar mills, fertilizer factories, or any other plant in which the product is in loose form and packaged in bags.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

ROLL HEADER

1. Name Used for Position in Plant Surveyed: Roll Header

D.O.T. Title: End Bander

Code: 8-56.61

Alternate Titles: Header

D.O.T. Definition: A Laborer process. Places cardboard disc over each end of roll of roofing materials; winds a piece of cloth over end of roll and glues it in place preparatory to shipment; glues a band of paper around cloth to hold it in place.

Items Worked on in Plant Surveyed: Rolls containing 70 linear feet of felt back floor covering, 8 or 12 quarters wide. (Quarter is a unit of measure used by the trade and equals one-quarter of a yard).

2. Usual Operator:

a. Sex: Male or female.

b. General Characteristics: Medium to large size; good physical stamina; average or less mental ability; rapid gross movements.

3. Physical Demands:

a. Activities: Walking, standing, turning, reaching, pushing, pulling, handling, fingering, feeling, seeing, working speed.

b. Working Conditions: Inside, noisy, adequate lighting, adequate ventilation, working with others, working around others.

c. Skill Required: Unskilled; job requires deftness in handling such items as wet gummed tape, discs of burlap and floor covering material, labels and glue brush; skill at judging location of burlap, disc and labels so that they will center up with the end of the roll.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

ROLL HEADER (Contd.)

4. Details of Physical Activities: Walks around immediate work area and occasionally to supply room (a distance of approximately 100 feet). Stands all day in work position. Turns and reaches to get items from work table and to obtain roll of floor covering, pushing or pulling to cause it to roll along rails to or from the work position. Handles discs of floor covering up to 12 inch diameter, discs of burlap up to 18 inch diameter; gummed tape, glue brushes and light paper labels. Fingers burlap to lay pleats after it has been put on the roll. Determines by touch that label and gummed tape have been pressed into position. Determines gross movements of working partner and location of roll.
5. Details of Working Conditions: Works in a clean, well lighted, ventilated, and properly heated room, noisy from the sounds of conveying, cutting and other machinery. Works with partner operating on other end of roll and near roll machine operator.
6. Hazards: Worker would be injured if he stumbled into the hole in the floor through which the chain conveyor passes.

NOTE: Hole is at least partially guarded on all sides. If rail extensions leading to lowering conveyor are not in proper position, roll might drop over end of fixed rail onto the worker's toes. Worker must be careful to remain in proper operating area and keep rail extensions closed whenever rolls are being handled.

7. Sequence of Steps in Position in Plant Surveyed:

NOTE: Rolls of floor covering come to the heading position wrapped and fastened in heavy paper and traveling past on rails. One header is operating in the work position at each side of the rail.

- a. Standing at the side of the rail moves roll into position, with the other hand secures wooden plug from work table and inserts it in the end of the roll as far as attached disc of floor covering material will permit.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

ROLL HEADER (Contd.)

- b. Selects disc of scrap floor material equal to the diameter of the roll and places it over the end of the roll, secures it in position with a strip of gummed tape obtained from the dispenser, the tape being passed across the end and down the sides of the roll.
 - c. Centers disc of burlap over the end of the roll, folding it down the sides, forming neat pleats; fastens it into position with gummed tape wrapped around the roll and lapping over the edges of the burlap.
 - d. Brushes glue on burlap at end of roll, placing label indicating brand and pattern over the glued portion, and smooths it down with the hand.
 - e. When both ends are completed, workers act in unison to push the roll along the rails and onto the conveyor, timing the movements so that it arrives on the loading position just after a set of carrying lugs on the conveyor chains has passed.
8. Equipment as Found in the Particular Plant Surveyed:
- a. Identification: Work table, to hold tape dispenser, glue pail and supply of plugs, discs, burlap, and labels; rails, for items to roll past work position into lowering conveyor.
 - b. Set-up and Maintenance: None
9. Equipment Variations Which May be Found in Other Plants:
- Substantially the same in all plants. Rolls may be deposited on trucks or other conveyance instead of onto lowering conveyor.
10. Usual Pre-employment Training: None. Previous factory experience is desirable and good physical condition essential.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

ROLL HEADER (Contd.)

11. Usual Training Procedure on the Job: New worker observes experienced worker on the job, taking over one step at a time until the entire operation has been learned. He will be coached from time to time by experienced worker at other end of roll or by foreman.
12. Any Training Deviations Suggested for the Blind: None
13. Production:
 - a. Full: 20 - 12 quarter length rolls or 22 - 8 quarter length rolls per hour. (In the plant surveyed the workers on the line completed the hour's production in from 35 to 40 minutes and rested the remaining portion of the particular hour).
 - b. Time to Reach Normal Efficiency: Average worker must keep up with the line after three to four days' experience.
14. Interrelation with Preceding and Succeeding Jobs: Application of an incorrect label would lead to considerable confusion in the storage and shipping departments. Only one or two rolls may be stored on the rails between the roll machine and the heading position. Therefore, any lag on the part of the headers will cause a stoppage of the entire line.
15. Teaming with Other Workers: Action of the two headers in bringing the roll into working position and moving it into the lowering conveyor must be closely coordinated. Movement of the roll during the heading operation would slow down the work. Poor coordination in moving the roll onto the lowering conveyor might cause it to jam and damage the conveyor or the material.
16. Modification, Deviation, Special Tools for the Blind:

None required.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

WRAPPING AND PACKAGING

ROLL HEADER (Contd.)17. Sight Requirements and Conditions:

a. Vision Required for the Job: Partial vision. Sufficient sight to follow gross movements of the other header at a distance of 10 feet, to quickly judge approximate position on which to locate gummed tape and labels, and see outline of large lugs on conveyor at distance of four feet.

b. Condition Affecting Suitability of a Particular Job:

1. For the Totally Blind: Rate of operation would have to be reduced. The other header would have to be willing to assume responsibility for coordinating his motions with those of the blind worker and for securing paper labels and other supplies.
2. For the Partially Sighted: Lighting conditions compatible with the degree and type of vision available; sufficient vision to determine proper labels, or other worker must be willing to assume this responsibility.

18. Avoid the Following Conditions: For a totally blind worker: situations where he must be responsible for the selection of proper labels; where the roll is disposed of by depositing it onto a lowering conveyor requiring close timing. For the partially sighted: situation where handling onto truck or other conveyors requires lifting that is not compatible with the worker's eye condition.

19. Other Jobs Often Combined for Full Time Employment: This job may be frequently combined with that of roller, wrapper, trucker, rug roller and tuber, and bundler according to the plant production and layout.

20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

The heading operation may be found throughout the country in any plant where the product is packaged in roll form. This includes plants making products such as felt and other types of building paper; rolled roofing and wrapping paper; floor covering such as linoleum, carpets, cotton, woolen and grass carpets and rugs.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

FEDERAL SECURITY AGENCY
Office of Vocational Rehabilitation
Washington 25, D. C.

November 14, 1949

REHABILITATION SERVICE SERIES NUMBER 58 - SUPPLEMENT 7

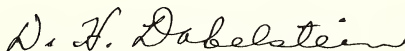
To : Divisions of Vocational Rehabilitation (in States with no separate Agency for the Blind); Commissions and Other Agencies for the Blind.

Subject: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category GC-3 - Material Handling.

The attached information on Material Handling is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as the 3rd category in Part II, General Coverage Series. It describes a few of the typical jobs frequently found in the category suitable for performance without the use of sight. Like the jobs described in the previous issue, those in this category have been observed and tested by a blind member of the staff of Services for the Blind.

Other categories of job specifications are being prepared and will be forwarded to you at an early date. Additional copies of the Handbook or any of its supplements will be furnished upon request.

We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.



Donald H. Dabelstein
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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

GENERAL COVERAGE SERIES

Category GC-3

MATERIAL HANDLING

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

GENERAL COVERAGE SERIES

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

General Information Sheet

D. O. T. Alternate Titles: (Trucker, Hand (any industry) (box pusher; collector; floor boy or girl; floor trucker; floor truckman; handler; hauler; material handler; material man; stock mover; transfer man; truckman; truck pusher; wheeler). (Frequently designated according to material handled, as casting trucker; cloth trucker. May be designated according to type of equipment used or area of work, as dollyman; inside-transfer man; platform trucker.) See Page 1421, Dictionary of Occupational Titles, Volume I, Second Edition. (Stacker (any industry) (piler; setter; shelf man; stock placer; storer.) (Conveyor Loader and Unloader (any industry) (conveyor feeder), (Stock Clerk (any industry) (order filler).

Description of Job Category: This category is concerned with the handling of materials on and off the conveyors, which transport the material, or the transfer of the items by the use of vehicles or by carrying it directly from one location to another. This would include such work as lifting bags of material from the stack and placing them on a lift platform, truck, or conveyor. The position might also include the unloading and restacking of items. This category may include the selection of a number of different items and collecting them in one package, such as the duties of a stock clerk. Conveyors may be loaded by dumping the items on it, placing them in a certain position with respect to cleats, or by hanging them on hooks. Items may be merely lifted and set down again a short distance away or carried in a worker's arms, or loaded on his back. He may walk a considerable distance with them, such as between car and warehouse. Under some circumstances, the job may include the operation of an electric towing or lift truck.

D. O. T. Definitions:

- a. Hand Trucker (any industry). Pushes or pulls hand trucks, cars or wheelbarrows used for transporting goods and materials of all kinds about a warehouse, manufacturing plant, or other establishment. Usually

MATERIAL HANDLING

(Loading and Unloading Conveyors and Trucks)

General Information Sheet (Contd.)

loads and unloads hand trucks or wheelbarrows. This job is usually performed by an unskilled worker who, in addition to trucking performs numerous other laboring duties, such as stacking goods or material.

- b. Stacker (any industry). Stacks full or empty containers, material, or products in boxcars, storeroom, warehouse, or other part of an industrial establishment. Transports items to be stacked, using hand truck, conveyor, or hand tools, such as a shovel or pitchfork. Lifts heavy containers or articles by loading them on platform of stacking machine and turning crank to raise platform.
- c. Conveyor Loader (any industry). Loads material on belt, chain, or roller conveyor, by hand or using such tools as shovel or pitchfork. May unload and transfer material from conveyor to bin, carton, skid, or other conveyor.
- d. Stock Clerk (any industry). Receives, stores, and issues equipment, material, merchandise, or tools in a stockroom or storeroom: Checks incoming orders against items as listed on requisitions or invoices, counting, grading, or weighing the articles.

Characteristics of Usual Worker: Men or boys are usually employed according to the type of items handled. Where small items are handled, women are often used. Workers are usually the type accustomed to medium or heavy physical work and accustomed to medium or low wages.

Physical Requirements, Aptitudes, and Abilities: Most material-handling jobs require good physical stamina and strength to handle items weighing from 15 to 120 pounds; however, in cases of small items, no special physical strength is required and worker may sit at the job; with larger items, the workers must have the ability to lift, carry and handle the object properly in order to avoid injury. In the loading of small items on the conveyor, good finger and manual dexterity may be essential. The work usually does not require much mental ability or a high degree of speed but often the worker must be able to adjust to continuous monotonous application to the job.

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

General Information Sheet (Contd.)

Training and Preparation Procedures: Usually the worker is trained on the job in a few minutes or hours of instruction and expected to come up to production immediately or in a day's time. In the handling of heavy items it is essential that the worker be in good physical condition before starting.

Safety Precautions, Health Conditions, and Hazards: The greatest necessity for safety precautions on the part of the worker is, in the handling and stacking of heavy items, to avoid dropping them on toes, straining of muscles, or injury from falling stacks. Cuts and abrasions on the hands may be caused by rough or sharp protrusions from the article or package. Health conditions are in general those of the plant in which the worker is found and are usually good. This work may be conducted on loading docks or platforms where there is danger of stepping off the edge or the necessity of looking out for oncoming trucks.

Industries Where this Category is Frequently Found: This category is found in one form or another in practically every industry, and even in small plants, there may be one or two positions in which material handling is the exclusive responsibility of one worker. In highly organized production plants, the loading of conveyors or handling of material between operations may be the only opportunity for the employment of blind persons.

Jobs to be Avoided Although Seemingly Suitable: In the loading or unloading of conveyors by the totally blind, avoid situations where items must be placed between others already on the conveyors or in which it is required that the worker promptly complete the unloading or shut off the conveyor. Avoid situations where reading is required to segregate similar containers into various stacks according to lot numbers or other markings. For certain types of partial vision, avoid situations requiring travel through poor lighting conditions.

Combination Jobs: This job is frequently combined with that of shipping or receiving clerk responsible for the selection of material, according to the job with which it is combined, such as machine tending, wrapping and packaging.

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

SALVAGE HANDLER

1. Name Used for Position in Plant Surveyed: Salvage Handler

D. O. T. TITLE: Waste-material man (any industry)

Code: 9-89.86

Alternate Title: Salvage-dock laborer, salvage man, salvage sorter, scrapman, wasteman, waste picker, and waste sorter.

D. O. T. Definition: Waste-material man (any industry). Salvages rubber, cloth, metal, and other materials from scrap, refuse boxes, and floor sweepings. Sorts materials according to type, quality, condition, coloring, marking, and other characteristics. Separates metal particles, using magnet or wire screen. Bales materials and stacks bales. Fills customers' orders by weighing required quantities. Removes baled or loose materials.

Items Worked on in Plant Surveyed: Truck loads of paper, cardboard, and other waste material.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, good physical stamina.

3. Physical Demands:

a. Activities: Walking, bending, turning, reaching, lifting, carrying, hearing, talking, pushing, pulling.

b. Working Conditions: Inside, adequate ventilation, dirty, dusty, adequate lighting, works alone, works around others, works with others.

c. Skill Required: Ability to push and pull platform trucks, to handle and balance ordinary hand trucks and judge load limits for same, skill to operate motorized lift trucks.

4. Details of Physical Activities: Walks from one part of loading platform to another, pushing or pulling trucks loaded with waste materials, such as cardboard, paper and wooden trash. Reaches and bends down to secure armfuls of

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

SALVAGE HANDLER (Cont'd)

material or containers from truck. Lifts, turns and dumps it into larger container or large motor truck. May be required to throw material over side of truck at height of approximately 6 feet. Loaded containers may weigh up to 150 pounds or 300 pounds if two workers are lifting together. Must hear warning given by approaching truckers or motor platform trucks. Must talk with others to learn location of other materials or work to be done and to coordinate with another worker in the handling of heavy containers.

5. Details of Working Conditions: Works in a well-lighted, and well-ventilated truck dock; mostly works alone or around other workers who are handling other duties and moving other trucks. Occasionally works with another in the handling of heavy containers or trucks. Items may be dirty with sticky materials from the factory or dusty from floor sweepings.
6. Hazards: Such as being bumped into or bumping into other trucks, setting heavy containers on toes, over-straining from awkward lifting of heavy items.
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Box trucks and box platforms and other containers loaded with various types of trash are brought to one position on loading dock by other plant workers on loading dock.
- b. Containers with paper, cardboard, and similar materials, are moved by this worker to one end of platform.
- c. Loaded into one of several motor trucks or truck trailers already placed in position by others.
- d. As far as possible different types of trash material should be segregated in loading process.
- e. Large barrel-type containers may have to be dumped over the side by the use of a lift truck.
- f. Unloaded trucks are moved back toward the original position

MATERIAL HANDLING

(Loading and Unloading Conveyors and Trucks)

SALVAGE HANDLER (Cont'd)

at the center of the dock and the worker must keep the salvage end of the dock and area around motor trucks swept clean and neat.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Box trucks, box platforms, two-wheel hand trucks, motorized lift truck.
 - b. Set-up and Maintenance: By plant mechanics.
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:

Types of trucks vary from plant to plant. In some cases, material may be disposed of into bailing machines operated by same worker.
10. Usual Pre-employment Training: None; good physical condition necessary before starting job.
11. Usual Training on the Job: New worker is instructed by foreman and occasionally helped by experienced fellow workers.
12. Any Training Deviations Suggested for the Blind: The partially sighted worker should be carefully instructed as to the limitations of the work he is expected to do and of limitations on areas in which he is to travel. This arrangement must be checked by placement agent and agreed to by foreman.
13. Production:
 - a. Full: Must keep up with supply of materials except what help may be supplied when considered necessary by the foreman.
 - b. Time to Reach Normal Efficiency: One day.
14. Interrelation With Preceding and Succeeding Jobs: None
15. Teaming With Other Workers: Must assist other workers on handling of heavy containers such as in loading or unloading cars.

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

SALVAGE HANDLER (Cont'd)

16. Modification, Deviation, Special Tools for the Blind: None.
17. Sight Requirements and Conditions:
- a. Vision required for the Job: Travel vision, ability to observe persons at distance of 100 feet, major portions of field retained and not adversely affected by sudden light changes. Under very special conditions, totally blind have operated similar jobs.
 - b. Conditions affecting Suitability of a Particular Job:
 - 1. For the totally blind: Operation must be restricted to a room, not a freight dock, no elevator operation required or trucking into other areas. No operation of motor trucks. Bailing equipment must be so constructed as to meet the requirements of the Four Point Safety Pattern and must be approved by the placement agent.
 - 2. For the Partially Sighted: Only slow and small amount of trucking traffic in work area; no transfer to other fill-in jobs in unfamiliar areas. Sight and travel requirements, as well as dust conditions and the degree of lifting, must be compatible with the type and amount of vision and eye condition of the worker.
18. Avoid the Following Conditions: Occasional requirement for the movement of motor vehicles; close visual inspection and rapid movement in and out of areas of extreme light change; poorly lighted surroundings; heavy lifting by worker with certain eye conditions.
19. Other Jobs Often Combined for Full Time Employment: Janitor work in other parts of the plant; labor around the grounds, car loading and unloading; and other types of labor.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:
- Trash bailing is found in plants receiving products in small paper or cardboard containers or where paper is cut up and considerable waste generated in process of manufacturing. Most any type of industry may have car and truck loading and unloading operations.

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

OVERHEAD CONVEYOR LOADER

1. Name Used for Position in Plant Surveyed: Overhead Conveyor Loader.

D. O. T. Title: Conveyor loader (any industry).

Code: 9-88.01

Alternate Title: Conveyor feeder

D. O. T. Definition: Conveyor loader (any industry). Loads material on belt, chain, or roller conveyor, or by hand or using such tools as shovel or pitchfork. May unload and transfer material from conveyor to bin, carton, skid, or other conveyor.

Items Worked on In Plant Surveyed: Semi-finished drawer and drawer heads for metal file cabinet.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Short or average height, any size, medium physical stamina, adjustable to steady repetitive work.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, handling, feeling, hearing.

b. Working Conditions: Inside, noisy, adequate lighting, adequate ventilation, moving objects, working around others.

c. Skill Required: Unskilled; ability to handle objects in uniform routine manner, and to place 5/8 inch hole over end of slowly moving hooks which are about head high; if blind, must have excellent orientation and conception of activities within work area.

4. Details of Physical Activities: Walks only short distance of up to 3 or 4 steps according to location of supply of items. Mainly stands on large rubber floor mat at conveyor loading

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

OVERHEAD CONVEYOR LOADER (Cont'd)

position. Turns and usually stoops slightly to pick up file cabinet drawer which is standing head end on floor. Lifts drawer weighing approximately 15 pounds, handles it to turn head end up and reaches up to height of approximately 5 feet to hang it on two hooks on overhead traveling conveyor, reaches over and down to pick up a pair of drawer heads only weighing approximately 5 pounds, handles to separate them and to place them in position on a pair of hooks on overhead conveyor at height of approximately $4\frac{1}{2}$ feet. Feels $\frac{5}{8}$ inch holes in metal to determine their location. If blind, must hear to determine arrival of new supply of materials and activities of adjacent workers.

5. Details of Working Conditions: Works inside in a comfortable well-lighted, well-ventilated large room with a considerable amount of noise from operation of nearby machines and handling of sheet metal parts by other workers. Occasionally a handtruck with supply of heads is moved into work area. Overhead conveyor moves approximately 6 feet per minute, with blunt-pointed hooks hanging at height of $4\frac{1}{2}$ to 5 feet. Another worker is doing drying and sanding operations within 5 feet of work position and moves into work position to place items near the conveyor loader.

6. Hazards: None

7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Drawer which is standing head end on floor is grasped by the side, lifted, and transferred to the other hand which grasps the side at a point near the head of the drawer and holds it in a tilted position.
- b. Locates lower hole in metal head and places it over blunt pointed conveyor hook.
- c. Levels off head simultaneously with locating of second hole and places it over end of second hook.
- d. Repeats operation loading each pair of hooks which are at

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

OVERHEAD CONVEYOR LOADER (Cont'd)

intervals of 2 feet hanging from continuous moving overhead conveyor.

- e. When heads only are to be loaded, secures pair of heads from adjacent truck.
- f. Grasps one in each hand and while holding it in a vertical position, places holes in head over the pair of hooks hanging from the end of the crossbar on the overhead conveyor.
- g. In a similar manner loads the second head on the pair of hooks hanging from the opposite end of the crossbar.
- h. Occasionally changes type of hooks on crossbars as type of items changes.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Overhead conveyor is made up of crossbars attached to hangers traveling on under side of monorail and connected by a chain which spaces them at intervals of 2 feet. Conveyor is power-driven steadily at speed of 336 feet per hour, and carries items past the spray painters and through the drying oven.
- b. Set-Up and Maintenance: By plant mechanics.
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Overhead conveyors are substantially the same in all plants, with hooks designed to meet the demands of the particular items handled. Travel may be intermittent at regular frequencies or as controlled by worker unloading conveyor.

- 10. Usual Pre-employment Training: None.
- 11. Usual Training on the Job: Foreman instructs new worker who is given any further necessary coaching by experienced worker who is assigned during the break-in period.
- 12. Any Training Deviations Suggested for the Blind: In addition to regular instruction, a blind person should be given the opportunity to become very familiar with the surrounding

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

OVERHEAD CONVEYOR LOADER (Cont'd)

area and all parts of the conveyor and its action at a time when work is not in progress.

13. Production:

- a. Full: 168 drawers per hour or 336 heads per hour.
- b. Time to Reach Normal Efficiency: 3 hours

14. Interrelation with Preceding and Succeeding Jobs: Must keep up with flow of supply with reserve of approximately 15 items. Supply to preceding worker comes from conveyor belt over which he has no control. Preceding and succeeding workers receive graded incentive payment and their maximum earnings depend upon all hooks being loaded.

15. Teaming with Other Workers: None.

16. Modification, Deviation, Special Tools for the Blind: None

17. Sight Requirements and Conditions:

- a. Vision Required for the Job: None
- b. Conditions affecting Suitability of a Particular Job:
 - 1. For the Totally Blind: The supply of items must be always placed within arms reach and light in weight enough so they can be accurately controlled by one hand leaving the other hand free to locate hooks in holes. (In plant surveyed, location of supply of items varied extensively in work area and required object perception.) There should be some means for blind persons to maintain orientation such as edge of floor mat or bench or noise of conveyor traveling. No visual inspection or travel to secure supplies.
 - 2. For the Partially Sighted: No visual inspection. Any travel to secure supplies and any lifting must be compatible with worker's eye condition.

18. Avoid the Following Conditions: Avoid totally blind worker being placed in a position where conveyor is already partially

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

OVERHEAD CONVEYOR LOADER (Cont'd)

loaded by previous workers; avoid small hooks and holes or items where holes are difficult to locate.

19. Other Jobs often Combined for Full-Time Employment: Other material handling, wrapping operations, cleaning or polishing.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

This type of conveyor is usually found in a highly-equipped or continuous line production and most often are found in departments where spray or dip painting, washing, or drying are included.

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

CONVEYOR UNLOADER

1. Name Used for Position in Plant Surveyed: Conveyor Unloader
2. D. O. T. Title: Conveyor loader (any Industry)

Code: 9-88.01

Alternate Title: Conveyor feeder

D. O. T. Definition: Conveyor loader (any industry). Loads material on belt, chain, or roller conveyor, or by hand or using such tools as shovel or pitchfork. May unload and transfer material from conveyor to bin, carton, skid, or other conveyor.

Items Worked on in Plant Surveyed: Steel wire baskets loaded with oily parts or completed bearings en route to washing machine.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Average or large size preferred; good physical stamina; close attention to work.

3. Physical Demands:

a. Activities: Walking, standing, bending, turning, reaching, lifting, carrying, pushing, pulling.

b. Working Conditions: Inside, odors, adequate ventilation, noisy, adequate lighting, works around others.

c. Skill Required: Unskilled; ability to lift properly and swing metal basket accurately into position on stack.

4. Details of Physical Activities: Walks a distance up to 150 feet to loosen material which has stopped traveling on conveyor; in unloading position walks only a few steps; stands all day at work position; lifts basket, weighing from 5 to 50 pounds and measuring about 15 by 18 by 8 inches to remove it from conveyor, turns and may bend or reach to stack it on platform; may carry it a distance of 3 to 8 feet, pushes or pulls baskets to start them moving on conveyor.

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

CONVEYOR UNLOADER (Cont'd)

5. Details of Working Conditions: Works inside, well ventilated, well lighted room; is subject to odors and fumes from oils which are present on all articles handled; room is noisy from sound of heavy punching machinery and discharge of air jets, handling and movement of materials. Other workers come and go to bring empty and remove loaded platforms or to keep material moving on conveyor. Other workers are at inspection positions adjacent to conveyor and are loading baskets onto it.
6. Hazards: Only from bumping or pinching fingers when setting heavily loaded baskets next to others already stacked on platform.
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. With both hands grasps baskets by hand-holds provided at each end.
- b. Lifts and swings them from conveyor onto platform already put in position behind workers by truckman.
- c. Must place baskets neatly in position starting rows next to a side and an end rack already in position on the platform in order that the right numbers of baskets may fit easily into position.
- d. Continues moving baskets from conveyor onto platform until entire area has been covered.
- e. Applies second, third, and sometimes fourth layer, and when platform is loaded, places final side rack in position.
- f. Continues loading other platforms in work area.
- g. Truck man removes loaded platform and replaces it with an empty.

NOTE: (Two workers alternate between loading the platforms and tending conveyor which consists of keeping baskets moving down to unloading position. Workers may alternate on hourly, half-day, or full day basis.)

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

CONVEYOR UNLOADER (Cont'd)

8. Equipment as Found in the Particular Plant Surveyed:
- a. Identification: One belt conveyor and one gravity conveyor each approximately 150 feet long which converge at unloading position; Lift-truck platforms, approximately 3 by 4½ feet, equipped with removable side racks.
 - b. Set-up and Maintenance: By plant mechanic.
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:
Material may be placed on or slid along metal-topped tables instead of conveyors; items may be transferred to other conveyors instead of to platforms, or brought to work positions on platform instead of conveyors, or articles may be dumped out of their containers into bins, chute or on to other conveyors.
10. Usual Pre-employment Trainings: None, except worker should be in good physical condition before starting work.
11. Usual Training Procedure on the Job: Instruction by foreman and further guidance by another worker helping at the same position.
12. Any Training Suggestions Suggested for the Blind: None
13. Productions:
- a. Full: 750 baskets per 8 hour day
Flow is not uniform so rate of handling may be at least twice this much over short periods.
 - b. Time to Reach Normal Efficiency: Two to three hours.
14. Interrelation with Preceding and Succeeding Jobs: Worker should keep conveyor cleared (which may be available at unloading position for stopping conveyor) irrespective of rush generated by inspectors in preceding position; no relation to following positions. In other plants, loading conveyors may be at the beginning of the line and supply must be kept ready to provide uniform flow of materials to succeeding positions.

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

CONVEYOR UNLOADER (Cont'd)

15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None (for loading and unloading conveyors only)
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: No alternating on other work requiring sight; no requirements for observing condition of conveyor load beyond arm's reach; no requirements for segregating or tallying according to job tickets, grade markings, color coatings or other indicators.
 2. For the Partially Sighted: Sight and travel requirements must be compatible with the type and amount of vision and eye condition of the worker, as well as dust conditions and the degree of lifting.
18. Avoid the Following Conditions: Transfer to other jobs which have not been approved as suitable for persons without the use of sight.
19. Other Jobs Often Combined for Full Time Employment: This job may often be combined with any other type of material handling such as truck or car loading or unloading, warehouse stacking, trucking by hand or motor.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Any production factory where articles in process or finished condition are packaged in containers or by themselves weighing from 50 to 75 pounds, or where materials are transported from one work position to another in baskets or containers, or by themselves weigh from 25 to 50 pounds.

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

STOCK CLERK

1. Name Used for Position in Plant Surveyed: Stockman

D. O. T. Title: Order Filler (any industry)

Code: 9-88.40

Alternate Title: Assemblyman, gathering clerk, make-up man, shipping clerk, tock clerk, stock picker, stock selector.

D. O. T. Definition: Order Filler (any industry). Fills customer's orders or department requisitions in a retail, wholesale, or manufacturing establishment; selects cased, boxed, or individual items of material or merchandise from stock room, assembly room, or warehouse according to itemized listings. Assembles items or material in groups and carries or transports them on hand truck to shipping room, loading platform, or similar areas. May be designated according to product handled, working area or manner in which orders are received.

Items Worked on in Plant Surveyed: Approximately 65 items such as screws, bolts, insulating brackets and other special parts or one section of the production shop.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, extremely retentive memory, good orientation to room surroundings, good ability to distinguish characteristics of parts when touched, nimble finders, good ability at writing and reading Braille, industrious, good personality, good cooperation with fellow workers.

3. Physical Demands:

a. Activities: Walking, standing, bending, stooping, turning, reaching, lifting, carrying, handling, fingering, feeling, hearing, talking, and crouching.

b. Working Conditions: Inside, adequate ventilation, adequate lighting, works alone, works around others, works with others, cramped quarters.

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

STOCK CLERK (Cont'd)

- c. Skill Required: Must have good ability at writing and reading short form Brailled notes rapidly, ability to remember and relocate position of any item in stockroom, to remember and count out proper number for requisition with a minimum of referring back, ability to recognize by touch most items for type and size without referring to card on bins, Excellent travel orientation within normal work area in stockroom consisting of two aisles approximately 30 feet long; ability to finger, manipulate and count rapidly large quantities of small parts.
4. Details of Physical Activities: May stand for periods up to half an hour counting out parts; walks around aisles of stockroom, reaching up, bending, stooping, or crouching, to secure items from various bins. Carries cardboard or other container weighing up to twenty pounds a distance up to 30 feet. Handles and fingers small parts to identify them and put them into small packages. Must often feel characteristics of surface to determine type of finish. Must hear to receive information on requisition and talk with others to coordinate work.
5. Details of Working Conditions: Works inside, well-ventilated, well-lighted comfortable surroundings free from noise or dirt. Most of work is done alone in same stockroom with other workers but at times works with others in checking or storing of received materials.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed: The main function is that of "filling orders from the Neon Sign Department through the following steps:

Worker:

- a. Requisitions are received on regular blanks, where items are checked off always in the same sequence, and are read by the stockroom foreman and notes made in Braille by the stock clerk (about 65 standard items).
- b. Using the Braille notes, the stock clerk secures items from various bins counting out quantity required, placing

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

STOCK CLERK (Cont'd)

each type of item in a container such as envelope or card-board box of appropriate size and assembling these into a suitable size larger container.

- c. The assembled order with a copy of the requisition is then placed on the counter for transfer to Neon Department by other workers.
- d. Stores away incoming stock which has been identified by receiving clerk or other worker if required. Frequently counts out number of items received before storing them away to see that they check with quantities shown on shipping bill which has been read and notes made in Braille.

Fill-in work frequently performed is that of

- a. Checking the quantity of received stock from other parts of the stockroom by either hand-counting or the use of a counting scale.
- b. Assisting with the storage of bundles of cartons or other large items which must be passed from one worker to another; moving them from trucks to shelves.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Stock bins are built on either side of aisle which is approximately 4 feet wide and extend from the floor to about 8 feet in height; work tables located at the end near the main aisle; Banks pocket size Braille machine which writes on a tape is used for making notes. (30 items use approximately 48" of tape).
- b. Set-up and Maintenance: None
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Materially the same except that a counter may be available across the end for delivery of items direct to the workers.

- 10. Usual Pre-employment Training: Sufficient schooling to read, write and count accurately.

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

STOCK CLERK (Cont'd)

11. Usual Training on the Job: Works with experienced stock clerk until names and locations of items are learned.
12. Any Training Deviations Suggested for the Blind: Blind workers should be especially trained in Braille reading and writing and should have previously developed a system of extremely brief abbreviations for the items on the requisition list and as nearly as possible memorize the list or at least its groups. The Braille cards or identification slips should be placed on each bin and the new blind worker compares these with the items found in the bin in order to learn the identification of each item and its location simultaneously.
13. Production:
 - a. Full: Regularly handles from 4 to 10 requisitions per day plus stock storage and fill-in jobs as required by foreman.
 - b. Time to Reach Normal Efficiency: 3 weeks to 2 months for sighted worker; 1 to 3 months for blind worker.
14. Interrelation with Preceding and Succeeding Jobs:

Orders must be accurately filled so that assembly department may not be delayed.
15. Teaming with Other Workers: For sighted workers the only teaming required is helping with storage of incoming stock. Blind workers must adjust to the convenience of the foreman and receiving clerk to read requisition and shipping bills to him (in any event, these men must review the requisition and shipping bills before they are passed on to the stock clerk either blind or sighted).
16. Modification, Deviation and Special Tools for the Blinds:

The only modification and equipment requirement is the adding of Brailled tags to the storage bins; the blind worker must be equipped with Braille writing equipment. The Banks pocket writer with tape is admirably suited to this purpose.

MATERIAL HANDLING
(Loading and Unloading Conveyors and Trucks)

STOCK CLERK (Cont'd)

17. Sight Requirements and Conditions:

- a. Vision Required for the Job: None
- b. Conditions affecting Suitability of a Particular Job:

- 1. For the Totally Blind: sufficient time between issuance of requisition and the demand for the material so that the requisition may be conveniently read and Braille notes made. The number of items should be sufficiently limited and suitably located so that the blind person may memorize their characteristics and location.
- 2. For the Partially Sighted: Sight and travel requirements must be compatible with the type and amount of vision and eye condition of the worker.

NOTE: In some cases of partial sight, work may be done with a reading glass or note may be made in large script according to the type of visual difficulty. Care must be exercised in adjusting the worker's methods to be sure that they are adequate and accurate.

18. Avoid the Following Conditions: Situations where assisting sight is not available or cannot be adequately compensated for by quality of work performed. Avoid long travel for securing or disposing of materials, the testing of parts to be dispensed where tester cannot be read speedily without the use of sight, the situation requiring writing to properly charge out items dispensed, and the pricing of items from catalogs.

19. Other Jobs Often Combined for Full-Time Employment:

Preparation of material such as cutting wire or tubing to length, cleaning and salvaging of rejected parts or assemblies, shipping clerk duties.

20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

This job is found in plants making products for which a number of small parts such as bolts, brackets, insulators, etc. are purchased from outside sources. Departments of large plants where prefabricated items are checked in from other departments. Supply and tool rooms dispensing equipment and light materials to the workers fabricating larger items. An example might be a welder's tool room in a steel mill.

OVR 33:58:B:5
Supplement 2

FEDERAL SECURITY AGENCY
Office of Vocational Rehabilitation
Washington 25, D. C.

February 1, 1949

REHABILITATION SERVICE SERIES NUMBER 58 - SUPPLEMENT 2

To: Divisions of Vocational Rehabilitation (in States with no separate Agency for the Blind); Commissions and Other Agencies for the Blind

Subject: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category GC-4, Machine Operations (Woodworking Power Tools)

The attached material on Machine Operations (Woodworking Power Tools) is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as the fourth category in Part II, General Coverage Series. It covers some of the principal jobs in this type of industry but it is not intended to be all inclusive of all possibilities for blind workers. Like the jobs described in the original issue, those in this category have been observed and tested by a blind member of the staff of the Services for the Blind branch.

Material on other categories of jobs is in preparation and will be forwarded to you for addition to the Handbook as soon as possible.

D. H. Dabelstein
Donald H. Dabelstein
ASSISTANT DIRECTOR

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

GENERAL COVERAGE SERIES

Category GC-4

MACHINE OPERATIONS
(Woodworking Power Tools)

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The above list only partially represents the employment opportunities for blind persons in this category and specifications for others will be issued as circumstances permit. Additional jobs such as the following should be sought and all jobs must be carefully analyzed for suitability under the conditions found in a particular plant: Operators of (1) tenoning saw, (2) mortising machine, (3) router, (4) shaper, (5) carving machine, (6) swing-cut-off saw.

HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERSGENERAL COVERAGE SERIESMACHINE OPERATIONS
(Woodworking Power Tools)GENERAL INFORMATION SHEETD.O.T. Alternate Titles for Machine Operators:

- a. Ripsaw Operator (woodworking): gang-ripsawyer; gang-saw operator
- b. Table Saw Operator (woodworking): circular-saw operator; crosscut sawyer; crosscutter; cut-off man; cutter; trimmer; trimming-saw operator
- c. Surface-Planer Operator (woodworking): facer operator; planer; planer-hand or man; planer-machine operator; planing machine operator; surfacer operator; wood-planer machine operator; wood-planer operator
- d. Jointer Plane Operator (woodworking): facer operator; jointer-machine operator
- e. Drill Press Operator VII (woodworking): None
- f. Horizontal-Drill Operator (woodworking): boring-machine operator; drill-press operator; drill-press hand; single-borer operator
- g. Drum and Brush Polisher (woodworking): drum and belt-sander operator; edge sander
- h. Lathe Operator (woodworking): swing-type lathe operator; automatic-lathe operator

Description of Job Category: The woodworking industry in its various stages of development and numerous types of manufacturing consists of more than one hundred individual classifications which make use of every known power woodworking tool and practically all hand tools.

The needs of these major industries are so varied that they make use of a wide variety of machine tools which are designed

MACHINE OPERATIONS
(Woodworking Power Tools)

General Information Sheet (Contd.)

to meet the special needs for processing the various types of wood. Each species possesses some characteristics which make it specially suitable for a definite use.

Lumber mills consist mainly of heavy saws of various types and arrangements and usually cut heavy larger dimension rough stock of all species which is sold to other mills specializing in resawing or to mills processing materials into finished lumber of smaller dimensions. Some of these mills have special equipment such as surface planes, tongue and grooving machines, and edgers for making flooring, siding, ceiling or ship-lap.

Planing mills have circle, band, and edging saws of various sizes and arrangements and surfaces; edging, routing, and specialty planes for sawing and planing to designated dimensions. Such materials are sold to mills and factories which manufacture the stock into specific items such as sash and doors, cabinets, furniture, toys and novelties. Such factories may use any type of woodworking power tools, depending upon the nature and extent of work performed. Basically, these are circle, band, jig, table and gang saws; surface, jointer, router, and edger planes; vertical, horizontal, and multiple drills of varying types and arrangements; turning lathes and innumerable power tools devised to meet a particular need. Most of these tools have individual motors although line shafting is frequently found. Some require skilled operators who work from blue prints and set up and maintain their own equipment, while many machines are operated by semi-skilled and unskilled workmen of lesser degrees of responsibility.

The furniture manufacturing industry is the fourth largest consumer, using about one and one-fourth billion board feet of high-grade hard wood annually.

The vehicle, implement, and handle industry uses large quantities of hard woods of which 60 percent to 75 percent is hickory and ash. This industry has a large variety of specialty equipment such as automatic lathes and machines for making handles, trusses, beams, spokes, hubs, and similar items, which are tended by machine operators rather than by journeymen.

The veneer industry uses vast quantities of both hard and soft woods. Hard woods are used in the veneering of furniture and making of high-grade plywoods. Soft woods are also used in making plywoods and single thicknesses are used in the manufacture of vegetable and berry crates and packing cases. Due to the nature of this industry, specialty equipment consisting of saws, peelers, and presses are predominant. Taping machines, patch cutters, and sanders are also specially designed but can be operated by semi-skilled or unskilled workmen.

MACHINE OPERATIONS
(Woodworking Power Tools)

General Information Sheet (Contd.)

Railroads use 130 millions of ties annually, each tie containing 32 board feet. The mills consisting mainly of portable drag and circle saws are usually found in the woods and cut stock left by a logging operation.

The building trade consumes seventy-five percent of the lumber milled. All grades and kinds of wood are used and practically every tool, both hand and power, will be found in use somewhere in this industry.

Factories, custom shops and makers of specialty products, employ from three to four people in small plants to several hundred in the larger ones. They are usually located in or immediately adjacent to metropolitan areas.

There is a wide range and variety of standard make and specialty tools that may be found in most any industry processing wood materials. Individual plants may have a variety of adaptations of the same tool and should be carefully surveyed to determine the feasibility of their operation by blind workers.

Mills cutting rough and finished dimension stock may be isolated or located in areas adjacent to centers of population but seldom in the larger urban areas. Such mills may be of any size and usually employ from fifteen to several hundred workers.

D.O.T. Definitions:

- a. Gang-Ripsaw Operator: gang-rip sawyer; gang-saw operator; gang sawyer. (woodworking, box) 6-33.216. Rips box lumber into boards of equal width on a machine equipped with a number of circular ripsaws mounted on a common horizontal shaft; adjusts distance between saws by loosening setscrews and changing number of spacing collars between the saws; manipulates lever to adjust height of pressure rolls to thickness of board, and starts machine; pushes board under feed rolls that carry it through the saws to cut it into strips of equal width.
- b. Cut-off Sawyer (IV) (woodworking) circular cut-off saw operator; circular-saw operator; crosscut-saw operator; crosscut sawyer; crosscutter; cut-off man; cutter; trimmer; trimming-saw operator. A general term used to designate a worker who cuts stock lumber to standard or desired lengths, cuts imperfections from lumber, or squares the ends of boards, or timbers, using a machine equipped with a circular saw, the teeth of which have been sharpened

General Information Sheet (Contd.)

and set to cut across the grain of the wood. Usually specifically designated according to the type of saw used, as Cut-off-saw Operator, Treadle Operator, Double-cut-off-saw Operator, Swinging-cut-off-saw Operator. Ref. Ripsaw Operator.

- c. Planer Feeder (II) (woodworking) A laborer, process. Lays wood stock on conveyors or between rolls that feed stock into planer (m).
- d. Jointer Operator (VII) (woodworking) facer operator; jointer machine operator. 6-33.462. Sets up and operates a machine to reduce wood stock to specified width or to smooth, bevel, rabbet or otherwise shape the edges to produce tight fitting joints when edges are pressed or glued together; fits cutter knives in cutter head and tightens setscrews with a wrench; places fence to guide stock at specified angle to cutting knives; places stock on edge against fence on machine table; starts machine and slides over rotating cutting knives, using fence as a guide; checks cut against blue prints or sketches, using miter gages or squares; makes necessary adjustments; feeds stock across cutting knives; turns part over and machines other edge; checks width of stock; places finished stock on hand truck.
- e. Drupp-Press Operator (VII)(woodworking). A laborer, process. Operates a drill press to cut holes in wooden parts of various articles according to lay-out markings. Performs repetitive routine operations. Does not set up machine.
- f. Boring Machine Operator, Horizontal; boring-machine operator, single-spindle; drill-press hand; drill-press operator; single-borer operator (woodworking) 6-33.411. Sets up and operates a horizontal single-spindled boring machine to bore holes of specific diameter and depth in wood parts to prepare them for assembly; fits bit into chuck of horizontal spindle and tightens chuck jaws with wrench; clamps stock on table and adjusts table to center stock with bit point; adjusts guide table or spindle stops to control depth of hold; starts machine and presses on pedal to move table bearing stock into rotating bit or to feed rotating bit into the stock; releases pedal to withdraw stock from bit or vice versa.
- g. Variety Sander; drum-and-belt-sander operator; edge sander (furn.) 6-33.123. Smooths curved surfaces and irregularly cut edges of furniture parts by manipulating them against an open sanding drum or an open sanding belt.

MACHINE OPERATIONS
(Woodworking Power Tools)

General Information Sheet (Contd.)

- h. Swing-Type Lathe Operator; lathe operator, automatic (shaped wood. art.) 6-33.371. Tends a machine that cuts such articles as table legs, implement handles, and baseball bats from wood stock; may set up machine, ref. Machine-set-up-man IV; starts machine; holds piece of stock in machine with one hand, and operates lever with other to clamp stock between machine centers so that it will rotate on its axis; pushes lever to swing rotating stock against cutters until cutting is complete; removes turned piece from machine. Sometimes specifically designated, such as Bat-lathe operator; Handle-lathe operator.

Characteristics of Usual Worker: All types, classes and races are employed on woodworking equipment as operators. Women are usually employed as assemblers, inspectors, and packers, and seldom as machine operators.

Physical Requirements, Aptitudes, and Abilities: Saw mill work usually requires rugged individuals of strong physique, and uses workers within a wide range of mental ability. Machine operators in resaw and planer mills require men of strong physique whose mental ability is average or above average.

Custom shops employ mostly men of average strength, whose mental ability is average or better.

Toy factories, furniture plants, and wood specialty shops employ both men and women of varying degrees of strength, size, and mental ability.

Training and Preparation Procedures: The machine operations in the woodworking industry utilize workers who possess varying degrees of skill, but it also uses a high percentage of unskilled labor.

Most of the laborers require no training other than instruction on the job. They are expected to meet production requirements immediately or within a few hours or days.

Skilled and semi-skilled workers may receive training on the job for varying periods depending on the skill required, may serve an apprenticeship under the direction of a journeyman, or may receive training in a vocational school. Stock producing mills employ a high percentage of laborers, while factories, custom shops, and makers of specialty products, employ a high percentage of journeymen who have served

MACHINE OPERATIONS
(Woodworking Power Tools)

General Information Sheet (Contd.)

apprenticeships of three to six years. In general, workers in the industry are unionized. They receive from \$.75 an hour for unskilled laborers and machine operators to \$2.00 an hour for mechanics and journey men, and participate in unemployment and accident benefits.

Safety Precautions, Health Conditions, Hazards: Cramped quarters, litter underfoot and on the machines, inadequate safety devices, falling material, and disregard for simple safety practices are the usual causes of accidents.

Occasionally material is thrown from the machine or dropped causing unavoidable accidents. Sharp splinters may cause lacerations and infections and the hands are frequently skinned by scraping them against rough material. Wearing gloves greatly lessens these hazards, but in some instances may introduce hazards of a more serious nature. Skin irritations are not uncommon and breathing fine saw dust and splinters irritates the nostrils and lungs of some people. This condition is lessened by wearing a mask with a filter, and the installation of dust-collecting and filtering equipment.

The heavier and rougher processing plants are usually excessively ventilated because of the necessity of open runways for permitting the passage of large quantities of materials. Heavy high-speed equipment creates terrific noise and vibration and throws off quantities of saw dust which irritates the lungs and skin. Heavy material is occasionally dropped which may cause injury to the feet and legs.

Lighter mills working resawing and finishing materials are equally noisy and dusty but better ventilated. Because of working with smaller and lighter materials there are fewer injuries to the feet and legs although the fingers, hands and arms may be injured by high-speed cutting equipment.

Strict adherence to safety rules, care in the operation of machines and immediate attention to the treatment of bruises and lacerations greatly lessen the frequency and severity of all accidents. In general, operators of woodworking tools in this category work under well-regulated conditions of health and safety.

Industries Where This Category is Found: Although timbered areas have a greater number and variety of woodworking industries, they are not confined to any particular locality. They may be found in any part of the country and in any town or city, large or small.

MACHINE OPERATIONS
(Woodworking Power Tools)

General Information Sheet (Contd.)

The larger number of mills producing rough and finished stock are located in the Pacific Northwest; furniture plants are found in the South; and implement, handle, and other hardwood factories in the New England and North Midwest States.

Representative of this industry are furniture, toy, wood specialty, novelty, fishing tackle, house prefabricating, sash and door factories; cabinet shops; veneer plants; saw and shingle mills; and industries where by-products are manufactured from salvaged material. Any industry which uses wood for crating, cribbing, and bridging for the shipment of its products may have woodworking power tools.

Jobs Usually to be Avoided Although Seemingly Suitable: Inspection requiring detection of pitch pockets, knots, color, and grain; assembly requiring inspection; machine operation requiring inspection or grading of material; machine operation requiring set-up adjustment or maintenance; machine operation with inadequate or inferior guards.

Combination Jobs: Jobs often combined with machine operation to provide full-time employment are hand-sanding, assembly, wrapping and packing.

MACHINE OPERATIONS
(Woodworking Power Tools)

DRILL-PRESS OPERATOR (Contd.)

1. Name Used for Position in Plant Surveyed: Drill-Press Operator

D.O.T. Title: Drill-Press Operator (VII) (woodworking)

Code: 6-33.411

Alternate Titles: None

D.O.T. Definition: Drill-Press Operator (VII) (woodworking).

A laborer, process. Operates a drill press to cut holes in wooden parts of various articles according to lay-out markings. Performs repetitive routine operations. Does not set up machine.

Items Worked on in Plant Surveyed: Chair legs

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Slight of build, medium height nimble, and average mental ability.

3. Physical Demands:

a. Activities: Standing, turning, reaching, lifting, pushing, pulling, handling, feeling, hearing.

b. Working Conditions: Inside, dusty, dirty, noisy, adequate lighting and ventilation, working around others, cramped quarters, mechanical hazards.

c. Skill Required: Semi-skilled; ability to locate position and small items quickly and accurately and to judge the operation of the machine by sound and feel from resistance on the feed lever.

4. Details of Physical Activities: Stands all day, reaches to secure and dispose of material, lifts stock, feels to locate jig and inserts material, pushes and pulls control lever to feed cutting tools to material.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

DRILL-PRESS OPERATOR (Contd.)

5. Details of Working Conditions: Works inside, around others, in crowded, adequately lighted and ventilated room which is noisy, dusty and dirty because of running machinery and the whine of a saw or plane and high-speed cutting tools which throw off quantities of fine saw dust; mechanical hazards from improper contact with rotating machinery.
6. Hazards: Loose sleeves, gloves, or tie should not be worn. By locating identification points on the jig, the worker will avoid running his hands into the rotating drill.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. The worker reaches forward with the left hand, removes stock from pile and inserts in jig bringing right hand end against the stop.
 - b. Holding the chair leg to be drilled firmly with the left hand, grasps the drill-press handle with the right hand and pulls downward.
 - c. When the drill has traveled to a set depth, worker releases the handle, removes drilled stock with the left hand, reverses ends, repeats the process and places on supply truck to the right.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Sensitive, hand-feed vertical drill press (floor type), receives various size drills, countersinks and mortise bits.
 - b. Set-up and Maintenance: All set-up, adjustment and maintenance is performed by a set-up man.
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:

Primarily the same in all plants but may vary in size, location and type of control. May be of special design to meet a particular need.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

DRILL-PRESS OPERATOR (Contd.)

10. Usual Preemployment Training: None
11. Usual Training Procedure on the Job: Shop foreman instructs all new workers
12. Any Training Deviations Suggested for the Blind: No training deviations for the blind worker with former machine work experience. Inexperienced blind workers should have some previous instruction and practice such as is given in vocational schools. The employment counselor should plan the content of the training and take such steps as are necessary to insure its effectiveness. This will give the worker an understanding of machinery, confidence in himself, knowledge of proper safety practices, and the ability to operate and judge the response of pressures on the handle of the machine.
13. Production:
 - a. Full: Not established
 - b. Time to Reach Normal Efficiency: Three to four weeks
14. Interrelation with Preceding and Succeeding Jobs: Succeeding operator performs identical operations using different jigs. This requires that working speed and production rate of both operators be geared approximately the same in order to insure sufficient quantity of drilled legs to facilitate assembly.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting the Suitability of a Particular Job:
 1. For the Totally Blind: No travel outside the work area to secure or dispose of material
 2. For the Partially Sighted: Lighting conditions and travel requirements should be compatible with the type and amount of vision of the worker.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

DRILL-PRESS OPERATOR (Contd.)

18. Avoid the Following Conditions: Transfer to other jobs which have not been approved as suitable for performance without the use of sight. Jobs requiring the operator to set up his own machine.
19. Other Jobs Often Combined for Full-Time Employment: In the machine department this job may be combined with operating the horizontal borer, drum and brush polisher, or the worker may be shifted to the assembly and packing department where he can hand-sand, assemble chair backs, or wrap and package furniture.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

In furniture, toy, wood specialty, novelty, fishing tackle and prefabricating factories; cabinet shops; and industries where by-products are manufactured from salvaged material.

Although timbered areas have a greater number and variety of woodworking industries, this job is not confined to any particular locality. It may be found in any part of the country and in any town or city, large or small.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

HORIZONTAL DRILL OPERATOR

1. Name Used for Position in Plant Surveyed: Horizontal Drill Operator

D.O.T. Title: Boring-Machine Operator, Horizontal (woodworking)

Code: 6-33.411

Alternate Titles: Boring-machine operator, single-spindle; drill-press hand; drill-press operator; single-borer operator.

D.O.T. Definition: Boring-Machine Operator, Horizontal; boring-machine operator, single spindle; drill-press hand; drill-press operator; single-borer operator (woodworking) 6-33.411. Sets up and operates a horizontal single-spindled boring machine to bore holes of specific diameter and depth in wood parts to prepare them for assembly; fits bit into chuck of horizontal spindle and tightens chuck jaws with wrench; clamps stock on table and adjusts table to center stock with bit point; adjusts guide table or spindle stops to control depth of hold; starts machine and presses on pedal to move table bearing stock into rotating bit or to feed rotating bit into the stock; releases pedal to withdraw stock from bit or vice versa.

Items Worked on in Plant Surveyed: Chair legs; rungs; posts.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Small, short, and of average mental ability.

3. Physical Demands:

a. Activities: Standing, turning, bending, stooping, reaching, pushing, pulling, handling, feeling, talking.

b. Working Conditions: Inside, dusty, dirty, noisy, adequate lighting and ventilation, cramped quarters, working around others.

c. Skill Required: Semi-skilled, good orientation within arm's reach; ability to judge the operation of the machine by sound and feel of the work being performed by the machine.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

HORIZONTAL DRILL OPERATOR (Contd.)

4. Details of Physical Activities: Stands all day, turns, bends, reaches, feels and pushes to locate position of stock to be placed in miter-guide and pushed into drill. Pulls finished work from drill, handles and places on supply truck.
5. Details of Working Conditions: Works inside and around others in crowded, adequately lighted and ventilated room which is noisy and dusty because of running machinery and high-speed cutting tools which throw off quantities of fine saw dust.
6. Hazards: There are no particular hazards; however, the worker should adhere to general safety practices, wear no loose sleeves, gloves, or tie.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. Worker reaches, picks up work from supply stock with left hand, locates and adjusts material squarely against the guide.
 - b. Holds work firmly with both hands and pushes it to the right against the miter-guide and forward against the stop.
 - c. With the right hand pulls the drilled part away, places it on the truck to the right of the machine while the left hand picks up another piece to be drilled.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Horizontal drill (individual motor) sometimes called a horizontal borer. Chuck is mounted in a horizontal position, receives a variety of sizes and types of drills, countersinks, and chucking heads and is equipped with an adjustable miter-guide.
 - b. Set-up and Maintenance: Set-up man makes all adjustments and maintains equipment.
 - c. Modification: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

HORIZONTAL DRILL OPERATOR (Contd.)

9. Equipment Variations Which May be Found in Other Plants:

Primarily the same in all plants but may vary in size, location and type of control. In some machines, a foot pedal or hand control causes the drill to move forward while the work is held stationary. May be of special design to meet a particular need.

10. Usual Preemployment Training: None

11. Usual Training Procedure on the Job: Shop foreman instructs all new workers.

12. Any Training Deviations Suggested for the Blind: No training deviations for the blind worker with former machine work experience. Inexperienced blind workers should have some previous instruction and practice such as is given in vocational schools. The employment counselor should plan the content of the training and take such steps as are necessary to insure its effectiveness. This will give the worker an understanding of machinery, confidence in himself and his ability to operate power equipment, to acquire the feel of the machine's response to the various pressures, and a knowledge of proper safety procedures.

13. Production:

a. Full: Not established

b. Time to Reach Normal Efficiency: Three to four weeks

14. Interrelation with Preceding and Succeeding Jobs: None

15. Teaming with Other Workers: None

16. Modification, Deviation, Special Tools for the Blind: None

17. Sight Requirements and Conditions:

a. Vision Required for the Job: None

b. Conditions Affecting the Suitability of a Particular Job:

1. For the Totally Blind: No travel outside the work area to secure or dispose of material.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

HORIZONTAL DRILL OPERATOR (Contd.)

2. For the Partially Sighted: Adequate lighting and travel requirements compatible with the type and amount of vision of the worker.
18. Avoid the Following Conditions: Transfer to other jobs which have not been approved as suitable for performance without the use of sight, and placement where maintenance is required.
19. Other Jobs Often Combined for Full-Time Employment: In the machine department, this job may be combined with drill press operating, or the worker may be shifted to the assembly and packing department where he can hand-sand, assemble chair backs or wrap and package furniture.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

In the furniture, toy, wood specialty, novelty, fishing tackle, and house prefabricating factories; cabinet shops; and industries where by-products are manufactured from salvaged material.

Although timbered areas have a greater number and variety of woodworking industries, this job is not confined to any particular locality. It may be found in any part of the country and in any town or city, large or small.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

TABLE SAW OPERATOR

1. Name Used for Position in Plant Surveyed: Table Saw Operator

D.O.T. Title: Cut-off Sawyer (IV)

Code: 6-33.214

Alternate Titles: Circular cut-off saw operator; circular-saw operator; crosscut-saw operator; crosscut sawyer; crosscutter; cut-off man; cutter; trimmer; trimming-saw operator.

D.O.T. Definition: Cut-off Sawyer (IV) (woodworking); circular cut-off saw operator; circular-saw operator; crosscut-saw operator; crosscut sawyer; crosscutter; cut-off man; cutter; trimmer; trimming-saw operator. A general term used to designate a worker who cuts stock lumber to standard or desired lengths, cuts imperfections from lumber, or squares the ends of boards, or timbers, using a machine equipped with a circular saw, the teeth of which have been sharpened and set to cut across the grain of the wood. Usually specifically designated according to the type of saw used, as Cut-off-saw operator, Treadle operator, Double-cut-off-saw operator, Swinging-cut-off-saw operator. Ref. Ripsaw operator.

Items Worked on in Plant Surveyed: Furniture parts, toy and novelty stock.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, quick and steady, average mental ability.

3. Physical Demands:

a. Activities: Standing, stooping, reaching, pushing, pulling, lifting, handling, hearing.

b. Working Conditions: Inside, dusty, dirty, noisy, adequate lighting, excessive ventilation, cramped quarters and mechanical hazards, working around others.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

TABLE SAW OPERATOR (Contd.)

- c. Skill Required: Semi-skilled; good orientation, ability to judge distances accurately and quickly and to judge the performance of the machine by sound and touch.
4. Details of Physical Activities: Stands all day; stoops occasionally to pick up material; turns and reaches for stock up to four feet in length, weighing approximately 15 pounds which he pulls and lifts from the supply truck; handles and pushes it through the saw.
5. Details of Working Conditions: Works around others in an adequately lighted and excessively ventilated room due to the proximity to open doors; very noisy from whining, high-speed cutters which prohibit conversing with others; and dusty because of quantities of flying saw dust from high-speed power saws and other equipment.
6. Hazards: Saw should be well guarded and all guards, stops and fence should be securely fastened to lessen the danger of getting fingers into the saw.

When cutting, the worker should be instructed to hold work firmly against the feed with both hands in a position which will clear the saw and to return to the starting point before releasing hold.

When ripping, the worker should not permit the hand to go beyond a marking on the fence which identifies the proximity of the saw and he should complete the cut by pushing the material through with another piece of stock.

The worker should never attempt to locate the cutting position of the saw with the fingers, but should locate the end of a revolving mandrel or push a stick into the saw to determine when it is in motion. He should keep superfluous material off the saw table and not stand directly in front of the saw.

The worker should keep floor free of scraps and litter to prevent slipping and falling into the saw.

7. Sequence of Steps in Position in Plant Surveyed:

- a. With one or both hands, depending upon the size of material, the worker picks up material from supply and places it on the saw table.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

TABLE SAW OPERATOR (Contd.)

- b. Adjusts to stop, to fence, or to miter-feed.
 - c. Pushes the material through and returns to starting position; removes and stacks.
8. Equipment as Found in the Particular Plant Surveyed:
- a. Identification: Table saw (individual motor) with 12-inch blade and adjustable table.
 - b. Set-up and Maintenance: Foreman makes all adjustments and provides maintenance.
 - c. Modification: None
9. Equipment Variations Which May be Found in Other Plants:
- Table saws vary in size and extent of adjustment; some have tilting arbors. Some run from line-shafting instead of having individual motors.
10. Usual Preemployment Training: None
11. Usual Training Procedure on the Job: Shop foreman instructs all new workers.
12. Any Training Deviations Suggested for the Blind: Blind workers without experience or knowledge of power equipment should have three or four months' training such as given at a vocational school. The employment counselor should plan the content of the training and take such steps as are necessary to insure its effectiveness. The training will give the worker confidence in himself and his ability, orient him to noises and working conditions, give him a working knowledge of power equipment and proper safety procedures.
13. Production:
- a. Full: Not established because of the wide variety of materials, shapes and dimensions.
 - b. Time to Reach Normal Efficiency: Ten to twelve days
14. Interrrelation with Preceding and Succeeding Jobs: None
- LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

TABLE SAW OPERATOR (Contd.)

15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting the Suitability of a Particular Job:
 1. For the Totally Blind: No travel outside the work area to obtain or dispose of material.
 2. For the Partially Sighted: Lighting conditions, travel requirements, degree of lifting, and exposure to fine dust should be compatible with the type, amount of vision, and eye condition of the worker.
18. Avoid the Following Conditions: Transfer to other jobs in the plant which have not been approved as suitable for performance without the use of sight, and placement requiring worker to set up, adjust, or maintain equipment; and inspection for grain knots and blemishes.
19. Other Jobs Often Combined for Full-Time Employment: Drum and brush polished, drill-press operator, planer operator, or work on any power equipment which does not require the use of sight, or transfer to packaging department where worker can wrap and package for shipment.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

In furniture, toy, wood specialty, novelty, fishing tackle, house prefabricating, sash and door factories; cabinet shops; and industries where by-products are manufactured from salvaged material; or any industry where wood is used in crating, cribbing, and bridging for the shipment of its products.

Although timbered areas have a greater number and variety of woodworking industries, this job is not confined to any particular locality. It may be found in any part of the country and in any town or city, large or small.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)RIPSAW OPERATOR

1. Name Used for Position in Plant Surveyed: Ripsaw Operator

D.O.T. Title: Gang-Ripsaw Operator (woodworking, box)

Code: 6-33.216

Alternate Title: Gang-rip sawyer; gang-saw operator; gang sawyer

D.O.T. Definition: Gang-Ripsaw Operator; gang-rip sawyer; gang-saw operator; gang sawyer (woodworking, box) 6-33.216. Rips box lumber into boards of equal width on a machine equipped with a number of circular ripsaws mounted on a common horizontal shaft; adjusts distance between saws by loosening setscrews and changing number of spacing collars between the saws; manipulates lever to adjust height of pressure rolls to thickness of board, and starts machine; pushes board under feed rolls that carry it through the saws to cut it into strips of equal width.

Items Worked on in Plant Surveyed: Toy and novelty stock

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Small, active and steady, average mental ability.

3. Physical Demands:

a. Activities: Standing, bending, reaching, pushing, pulling, handling, working speed.

b. Working Conditions: Inside, dirty, noisy, adequate lighting and ventilation, working around others.

c. Skill Required: Semi-skilled; good orientation and ability to locate position and work quickly and accurately, and to judge speed of material traveling through the saw.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

RIPSAW OPERATOR (Contd.)

4. Details of Physical Activities: Stands all day, works rapidly and steadily, bends most of the time, pulling, handling and pushing light pieces of material of $\frac{1}{4}$ " to $\frac{1}{2}$ " material, 4" to 12" wide and 6" to 6' long, into feed rollers of saw.
5. Details of Working Conditions: Works around others in an adequately lighted and ventilated room under strain of excessive noise (high pitch or squeal characteristic of saw and planer) from the operation of power equipment, and dirty because of dust thrown from other machines.
6. Hazards: There are no particular hazards; however, the worker should adhere to general safety practices, wear no gloves or tie.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. With the right hand, the worker picks up material, places it on the saw table against the miter-guide and pushes it to the right and forward between the feed rollers.
 - b. Holds it firmly against the guide with the left hand and determines when another piece should be butted against the end of the one disappearing between the rollers.
 - c. Keeps a constant flow of material butted end to end traveling between the rollers, being careful not to crowd the saw.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Gang-saw. A series of 4" circle saws mounted and spaced at designated intervals on a horizontal mandrel. Saws are enclosed with a housing. Feed rollers are directly in front of the saws with the top of the bottom roller (power driven) on a direct line with the surface of the saw table, and the top roller is equipped with an automatic adjustment spring to accommodate varying thicknesses of material. Table is equipped with miter-guide.
 - b. Set-up and Maintenance: Foreman sets, adjusts and maintains equipment.
 - c. Modification: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

RIPSAW OPERATOR (Contd.)

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same except some may not be enclosed or be equipped with double rollers with automatic adjustment.

10. Usual Preemployment Training: None

11. Usual Training Procedure on the Job: Shop foreman instructs all new workers.

12. Any Training Deviations Suggested for the Blind: No training deviations for the blind worker with former machine work experience. Inexperienced blind workers should have some previous instruction and practice such as given in vocational schools. The employment counselor should plan the content of the training and take such steps as are necessary to insure its effectiveness. The training will give the worker an understanding of machinery, confidence in himself, ability to operate power equipment, and knowledge of proper safety procedures.

13. Production:

a. Full: Not established because of the wide variety of lengths and widths of material processed; however, full production requires a flow of material end to end and in double rows when stock is narrow.

b. Time to Reach Normal Efficiency: Three to four weeks

14. Interrelation with Preceding and Succeeding Jobs: This position is located between the surface planer and gang-crosscut saw. The three operations are geared to process material at equal speed. Failure on any machine slows down the production of preceding or succeeding machines.

15. Teaming with Other Workers: None

16. Modification, Deviation, Special Tools for the Blind: None

17. Sight Requirements and Conditions:

a. Vision Required for the Job: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

RIPSAW OPERATOR (Contd.)

b. Conditions Affecting the Suitability of a Particular Job

1. For the Totally Blind: No travel outside the work area to obtain and dispose of material.
 2. For the Partially Sighted: Lighting conditions and travel requirements compatible with the type, and amount of vision of the worker. Lifting should be compatible with the eye condition of the worker.
18. Avoid the Following Conditions: Transfer to other jobs that have not been approved as suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: Operator of a gang-crosscut saw, and planer operator.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

Furniture, toy, wood specialty, novelty, fishing tackle, house prefabrication, sash and door and box factories; cabinet shops; and industries where by-products are manufactured from salvaged materials; or any industry where wood is used in crating, cribbing, and bridging for the shipment of its products.

Although timbered areas have a greater number and variety of woodworking industries, this job is not confined to any particular locality. It may be found in any part of the country and in any town or city, large or small.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

SURFACE PLANER OPERATOR

1. Name Used for Position in Plant Surveyed: Planer Man
D.O.T. Title: Planer Feeder (II) (a laborer, process) (woodworking)
Code: 8-33.11
Alternate Titles: None
D.O.T. Definition: Planer Feeder (II) (woodworking). A laborer, process. Lays wood stock on conveyors or between rolls that feed stock into planer.
Items Worked on in Plant Surveyed: Rough boards of random widths and lengths
2. Usual Worker:
 - a. Sex: Male
 - b. General Characteristics: Husky, any size, and of average mental ability.
3. Physical Demands:
 - a. Activities: Standing, lifting, pushing, pulling, handling, feeling, bending, stooping, and turning.
 - b. Working Conditions: Inside, adequate lighting, excessive ventilation, noisy, dusty, cramped quarters, mechanical hazards, working around others.
 - c. Skill Required: Unskilled. Should be able to adjust to working with varying dimensions of material and frequent changes in positions; should be skillful in judging squareness and pressures exerted on material fed to machine.
4. Details of Physical Activities: Stands all day, bends and stoops, pulls and pushes random lengths of material (6" to 6', weighing up to approximately 100 pounds); constantly handles and feels rough material to determine width. frequently turns and steps from one side of the stock pile to the other.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

SURFACE PLANER OPERATOR (Contd.)

5. Details of Working Conditions: Works inside around others in an adequately lighted room which is excessively ventilated because of proximity of the machine to open doors; excessive noise makes it impossible to take orders or converse while machine is in motion.
6. Hazards: The worker constantly breathes fine saw dust and frequently gets splinters in hands and fingers. Frequent colds are caused by excessive ventilation. The worker should be instructed in safety practices, to work without gloves, and to avoid working too close to the guard as the high-speed cutter-head and the sudden forward slipping of material may draw the fingers into the rollers; also to keep the material butted end to end and release hold about six inches before the guard is reached. (The guide should have an identification mark so the worker will be able to determine the point at which to release the material.)
7. Sequence of Steps in Position in Plant Surveyed:
 - a. With one or both hands, depending on the length of material, pulls stock from the pile, places it on the planer table, pushes it squarely against the guide and forward into the rollers.
 - b. Holds the material firmly with one hand if single widths (and both hands if double widths), continues pushing until the end of the material is approximately eight inches from the guard and releases.

The worker should keep a continuous flow of material butted end to end with each succeeding piece pushing the preceding one through the roller.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Surface planer (individual motor, double head), 12"
 - b. Set-up and Maintenance: Set-up, adjustment, and maintenance provided by foreman
 - c. Modification: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

SURFACE PLANER OPERATOR (Contd.)

9. Equipment Variations Which May be Found in Other Plants:

Single-head equipment of lesser dimension is frequently found. Vacuum attachments which remove all dust and shavings are common. Machines are occasionally located away from the line of truck traffic, or in a room where material is carried or transported by hand truck.

10. Usual Preemployment Training: None

11. Usual Training Procedure on the Job: None

12. Any Training Deviations Suggested for the Blind: Blind workers without knowledge or experience of power equipment should have three or four weeks' training such as given at a vocational school. The employment counselor should plan the content of the training and take such steps as are necessary to insure its effectiveness. The worker will gain confidence in himself and his ability, become oriented to noises and working conditions, gain a working knowledge of power equipment, and proper safety procedures.

13. Production:

a. Full: Not established because of the variety of widths and lengths of material processed.

b. Time to Reach Normal Efficiency: Ten to twelve days

14. Interrelation with Preceding and Succeeding Jobs: Production of succeeding operator depends upon the production of the planer, thereby requiring coordination of output of the two machines.

15. Teaming with Other Workers: None

16. Modification, Deviation, Special Tools for the Blind: None

17. Sight Requirements and Conditions:

a. Vision Required for the Job: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

SURFACE PLANNER OPERATOR (Contd.)

b. Conditions Affecting the Suitability of a Particular Job:

1. For the Totally Blind: No travel outside the work area to obtain or dispose of materials.
2. For the Partially Sighted: Travel requirements, lighting conditions, and the degree of lifting should be compatible with the type, and amount of vision and eye condition of the worker.
18. Avoid the Following Conditions: Transfer to other jobs which have not been approved as suitable for performance without the use of sight, and placement where set-up and maintenance are required.
19. Other Jobs Often Combined for Full-Time Employment: Operators of jointer plane, gang-ripsaw, gang-crosscut saw, horizontal borer, and drum and brush polisher.
20. Industries, Parts of Industries, Types of Plants Where This Type of Job Is Frequently Found:

In furniture, toy, wood specialty, novelty, fishing tackle, house prefabricating, sash and door, and box factories; cabinet shops; and industries where by-products are manufactured from salvaged material.

Although timbered areas have a greater number and variety of woodworking industries, this job is not confined to any particular locality. It may be found in any part of the country and in any town or city, large or small.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

JOINTER PLANE OPERATOR

1. Name Used for Position in Plant Surveyed: Planer Operator

D.O.T. Title: Jointer Operator (VII) (woodworking)

Code: 6-33.462

Alternate Titles: Facer operator; jointer machine operator

D.O.T. Definition: Jointer Operator (VII) (woodworking); facer operator; jointer machine operator. 6-33.462. Sets up and operates a machine to reduce wood stock to specified width or to smooth, bevel, rabbet or otherwise shape the edges to produce tight fitting joints when edges are pressed or glued together; fits cutter knives in cutter head and tightens set screws with a wrench; places fence to guide stock at specified angle to cutting knives; places stock on edge against fence on machine table; starts machine and slides over rotating cutting knives, using fence as a guide; checks cut against blue prints or sketches, using miter gages or squares; makes necessary adjustments; feeds stock across cutting knives; turns part over and machines other edge; checks width of stock; places finished stock on hand truck.

Items Worked on in Plant Surveyed: Table and desk tops, sides, and rails

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Small and active; average mental ability

3. Physical Demands:

a. Activities: Standing, turning, reaching, lifting, pushing, bending, handling, talking

b. Working Conditions: Inside, adequate lighting and ventilation, dusty, dirty, noisy, cramped quarters, working around others, mechanical hazards.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

JOINTER PLANE OPERATOR (Contd.)

- c. Skill Required: Semi-skilled. Should be able to adjust to working with varying dimensions of 3/4" boards, 4" to 12" wide and from 6" to 6' long, and to various working positions; should be skillful in judging angles, squareness, and pressure exerted on material being pushed across cutter head.
4. Details of Physical Activities: Worker stands all day, turns, reaches, bends, handles and adjusts small pieces of medium width and length across cutter head and stacks on truck.
5. Details of Working Conditions: Works inside, around others in adequately lighted and ventilated room which is noisy and dusty because of whining, high-speed cutting equipment which throws off quantities of fine shavings; frequently cramped quarters because of trucks used for transporting material about the factory.
6. Hazards: There are no particular hazards in the operation of the machine. Sometimes scraps and debris under foot cause worker to slip and fall into moving or cutting parts. Worker should be instructed to avoid pushing material less than 3" in width across the cutter head, to wear no gloves or a tie, and to keep hand on top of board and to keep fingers in line with the upper edge of the board.
7. Sequence of Steps in Position in Plant Surveyed:
- a. Worker picks up small pieces of material with the right hand and large ones with both hands, places and adjusts each piece squarely in the miter-guide.
- b. Holds firmly with both hands and pushes steadily across the receiving cutter and stacks on hand trucks.
8. Equipment as Found in the Particular Plant Surveyed:
- a. Identification: Standard jointer plane (individual motor), 4" bed.
- b. Set-up and Maintenance: Set-up, adjustment and measurement are made by the foreman.
- c. Modification: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

JOINTER PLANE OPERATOR (Contd.)

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants. Set-up, adjustment and maintenance are often the duty of the operator.

10. Usual Preemployment Training: None

11. Usual Training Procedure on the Job: The foreman instructs all new workers

12. Any Training Deviations Suggested for the Blind: Blind workers without machine experience should have training in machine operation such as given in a vocational school. The employment counselor should plan the content of the training and take such steps as are necessary to insure its effectiveness. Such training will familiarize the worker with the mechanics, operation, noise and movement of power equipment, will give him confidence in his ability and knowledge of proper safety procedures.

13. Production:

a. Full: Not established because of the variation in size and dimension of material processed.

b. Time to Reach Normal Efficiency: Two to three days

14. Interrelation with Preceding and Succeeding Jobs: None

15. Teaming with Other Workers: None

16. Modification, Deviation, Special Tools for the Blind: None

17. Sight Requirements and Conditions:

a. Vision Required for the Job: None

b. Conditions Affecting the Suitability of a Particular Job:

1. For the Totally Blind: No travel outside the work area to obtain or dispose of material.

2. For the Partially Sighted: Travel requirements, lighting conditions and degree of lifting should be compatible with the type, amount of vision, and eye condition of the worker.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

JOINTER PLANE OPERATOR (Contd.)

18. Avoid the Following Conditions: Transfer to other positions which are not approved as being suitable for performance without the use of sight; requiring the worker to set up, adjust, or maintain his own machine; and working without or with an inadequate guard.
19. Other Jobs Often Combined for Full-Time Employment: Surface planer; horizontal borer; drill press or other power equipment which can be operated without the use of sight; or transfer to the assembly department where worker can hand-sand, assemble, or wrap and package for shipment.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

In furniture, toy, wood specialty, novelty, fishing tackle, house prefabricating, and sash and door factories; cabinet shops; and industries where by-products are manufactured from salvaged material.

Although timbered areas have a greater number and variety of woodworking industries, this job is not confined to any particular locality. It may be found in any part of the country and in any town or city, large or small.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

DRUM AND BRUSH POLISHER

1. Name Used for Position in Plant Surveyed: Drum and Brush Polisher

D.O.T. Title: Variety Sander (furniture)

Code: 6-33.123

Alternate Titles: Drum and Belt Sander Operator; edge sander.

D.O.T. Definition: Variety Sander; drum-and-belt sander operator; edge sander (furn.) 6-33.123. Smooths curved surfaces and irregularly cut edges of furniture parts by manipulating them against an open sanding drum or an open sanding belt.

Items Worked on in Plant Surveyed: Chair rockers, arms, curved backs, slats and legs.

2. Usual Worker:

a. Sex: Male

b. General Characteristics: Small, active and steady, average mental ability

3. Physical Demands:

a. Activities: Standing, turning, bending, reaching, lifting, pushing, pulling, handling, feeling, talking.

b. Working Conditions: Inside, dusty, noisy, adequate lighting and ventilation, working around others, mechanical hazards.

c. Skill Required: Semi-skilled. Ability to judge the operation of the machine by sound and to locate working position by flow of air on the hands from the wheel, and the feel of the work being performed by the machine.

4. Details of Physical Activities: Stands all day, turns occasionally, reaches for and lifts small pieces of material, bends body in a forward and backward motion, pulling and pushing material against the polisher; handles and feels surface of material to determine smoothness; steps from side to side a distance of about four feet when securing and disposing of stock; listens to and talks with others to exchange necessary information.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

DRUM AND BRUSH POLISHER (Contd.)

5. Details of Working Conditions: Works inside, around others in an adequately lighted and ventilated room which is noisy from the operation of high-speed equipment and dusty from particles of fine dust from the polishing drum.
 6. Hazards:
 - a. The worker's fingers are constantly exposed to the sand paper as he guides his work. Taping the guide finger will protect the hand from skin abrasions and infections.
 - b. The worker constantly breathes fine particles of dust causing frequent irritation to the nostrils and lungs which may be lessened by wearing a mask with a filter.
 - c. Certain wood such as red or white cedar, spruce and cypress, occasionally cause skin irritations.
 7. Sequence of Steps in Position in Plant Surveyed:
 - a. Worker reaches to the right for material which he grasps in both hands and brings it up to contact the drum from the bottom. (A blind person retains his orientation by knowing his working position, and by the flow of air on his hands from the wheel.)
 - b. Moves the material forward, following the contour of the cut until the circuit has been completed.
 - c. Steps two steps to the left and repeats the operation on the bristle-brush polishing head in identically the same manner.
 - d. Places the finished piece on a truck to his left, and returns to supply truck to repeat the operation.
 8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Drum and brush polisher (belt-drive).
A mandrel mounted in a horizontal position and containing sandpaper drum on the right end and a stiff bristle-brush on the left end.
 - b. Set-up and Maintenance: Maintained by foreman
- LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)DRUM AND BRUSH POLISHER (Contd.)

c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Equipment may have a single drum or a different size drum on each end. It may have a drum and a disc. Mandrels may be either flat or "V"-belt drive, or the heads may be mounted directly on the shaft of a double-end motor. Similar functions may be performed on small sand belts and felt, buckskin, and asbestos-cloth polishing heads.

10. Usual Preemployment Training: None

11. Usual Training Procedure on the Job: Shop foreman instructs all new workers.

12. Any Training Deviations Suggested for the Blind: No training deviations for the blind worker with former machine work experience. Blind worker without experience or knowledge of power equipment should have three or four weeks' training in a vocational school. The employment counselor should plan the content of the training and take such steps as are necessary to insure its effectiveness. This will give the worker confidence in his ability, familiarize him with machine noises, and safety procedures.

13. Production:

a. Full: Not established because of the wide variety of shapes and sizes worked on.

b. Time to Reach Normal Efficiency: Four to five days.

14. Interrelation with Preceding and Succeeding Jobs: None

15. Teaming with Other Workers: None

16. Modification, Deviation, Special Tools for the Blind: None

17. Sight Requirements and Conditions:

a. Vision Required for the Job: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

DRUM AND BRUSH POLISHER (Contd.)

b. Conditions Affecting the Suitability of a Particular Job:

1. For the Totally Blind: No travel outside the work area to obtain or dispose of material.
2. For the Partially Sighted: Travel requirements, lighting conditions, and the exposure to dust should be compatible with the type, amount of vision, and eye condition of the worker.
18. Avoid the Following Conditions: Transfer to other jobs which have not been approved as suitable for performance without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: Operations on the drill press, horizontal borer, jointer plane, surface planer, or any machine which can be operated without the use of sight. Transfer to assembly department where worker can hand-sand, assemble chair backs, bottoms, or wrap and package furniture for shipment.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

Furniture, toy, wood specialty, novelty, fishing tackle, and house prefabricating factories; cabinet shops; and industries where by-products are manufactured from salvaged materials.

Although timbered areas have a greater number and variety of woodworking industries, this job is not confined to any particular locality. It may be found in any part of the country and in any town or city, large or small.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

AUTOMATIC LATHE OPERATOR

1. Name Used for Position in Plant Surveyed: Lathe Operator

D.O.T. Title: Swing-Type Lathe Operator (woodworking)
(shaped wood. art.)

Code: 6-33.371

Alternate Titles: Lathe operator, automatic

D.O.T. Definition: Swing-Type-Lathe Operator; lathe operator, automatic (shaped wood. art.) 6-33.371. Tends a machine that cuts such articles as table legs, implement handles, and baseball bats from wood stock; may set up machine, ref. Machine-set-up man IV. Starts machine; holds piece of stock in machine with one hand, and operates lever with other to clamp stock between machine centers so that it will rotate on its axis; pushes lever to swing rotating stock against cutters until cutting is complete; removes turned piece from machine. Sometimes specifically designated, such as Bat-lathe operator; Handle-lathe operator.

Items Worked on in Plant Surveyed: Furniture legs, decoy duck heads and bodies, handle grips, net floats, furniture decorations.

2. Usual Operator:

a. Sex: Male .

b. General Characteristics: Small or medium size, quick and steady, average mental ability.

3. Physical Demands:

a. Activities: Standing, turning, reaching, lifting, pushing, pulling, handling, feeling, talking.

b. Working Conditions: Inside, dusty, dirty, noisy, adequate lighting and ventilation, cramped quarters, working around others, mechanical hazards.

c. Skill Required: Semi-skilled. Ability to locate position and adjust to a working area of about 10 feet; to locate holes quickly in material to be placed on tail stock and to judge the operation of the machine by sound.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

AUTOMATIC LATHE OPERATOR (Contd.)

4. Details of Physical Activities: Stands all day, constantly reaching and handling stock up to six inches square, 32" long, and weighing approximately 25 pounds. Walks distances of four or five steps, turns, lifts, and disposes of stock, pushes and pulls lever to start and stop machine.
5. Details of Working Conditions: Works around others in a large adequately lighted and ventilated room with noise, vibration, and dirt from high-speed cutting equipment; occasionally cramped quarters; operator cannot converse with others without turning off machine.
6. Hazards: No particular hazards in the operation of the machine. Occasionally cramped quarters interfere with loading and unloading the machine and may cause the operator to drop material or thrust a hand into moving parts. Occasionally material breaks or is insecurely fastened in the machine, and as a result, the operator is sometimes injured by flying objects thrown by the machine. Special care should be given to fastening work in chuck as a safeguard against accidents from material being thrown from the machine.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. From supply truck at left, the worker picks up precut squares with both hands, steps two short steps to right, inserts in lathe, and pulls lever to clamp stock in chuck.
 - b. Reaches to right and downward to lathe-bed and pushes control to right to start machine.
 - c. Steps back one short step and listens for cutter to complete its travel and return to starting point and stop.
 - d. Steps one short step forward, pushes lever to stop rotating as indicated by noise of follower against the pattern; with both hands removes finished stock, places it on work table to right, steps two short steps to left and returns to supply truck.
8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Automatic lathe (wood specialty). Receives material up to 36" in length, has revolving cutter that

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

AUTOMATIC LATHE OPERATOR (Contd.)

travels from right to left located directly back to the work and controlled by action of a pattern attached to left of lathe-head, which controls contour of cut by action exerted on head stock.

b. Set-up and Maintenance: Foreman sets up, adjusts, and maintains equipment.

c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Lathe may not be equipped to operate from a pattern. Movement of the cutter may be manually controlled from left to right while contour against the handle controls the depth of the cut.

10. Usual Preemployment Training: None

11. Usual Training Procedure on the Job: Shop foreman instructs all new workers

12. Any Training Deviations Suggested for the Blind: No training deviations for the blind worker with former machine work experience. When workers are inexperienced in operating power equipment, they should have three or four weeks' training such as given in a vocational school. The employment counselor should plan the content of the training and take such steps as are necessary to insure its effectiveness. This will give the worker confidence, a working knowledge of and familiarization with machinery, machine noises, and proper safety procedures.

13. Production:

a. Full: 20 to 30 pieces an hour

b. Time to Reach Normal Efficiency: Three to four weeks

14. Interrelation with Preceding and Succeeding Jobs: None

15. Teaming with Other Workers: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Woodworking Power Tools)

AUTOMATIC LATHE OPERATOR (Contd.)

16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
- a. Vision Required for the Job: None
 - b. Conditions Affecting the Suitability of a Particular Job:
 - 1. For the Totally Blind: No travel outside the work area to secure or dispose of stock.
 - 2. For the Partially Sighted: Travel requirements and lighting conditions and degree of lifting should be compatible with the type, amount of vision, and eye condition of the worker.
18. Avoid the Following Conditions: Transfer to other jobs which have not been approved as suitable for performance without the use of sight, and placement where set-up and maintenance are required.
19. Other Jobs Often Combined for Full-Time Employment: Operating table saw, parting saw and hand and machine sanding. When making decoy ducks, eyes can be inserted and heads and bodies assembled. In some plants there may be a diversity of assembly operations.
20. Industries, Parts of Industries, or Types of Plants Where this Type of Job is Frequently Found:
- Furniture, toy, wood specialty, novelty, fishing tackle, and house prefabricating factories; cabinet shops; shingle mills; and industries where by-products are manufactured from salvage materials.

Although timbered areas have a greater number and variety of woodworking industries, this job is not confined to any particular locality. It may be found in any part of the country and in any town or city, large or small.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D. C.

August 31, 1951

REHABILITATION SERVICE SERIES NUMBER 58 - SUPPLEMENT 13

TO: Divisions of Vocational Rehabilitation (in States with no separate agency for the blind); Commissions and Other Agencies for the Blind

SUBJECT: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category GC-5, Machine Operations (Metal Working Power Tools)

The attached material on Machine Operations (Metal Working Power Tools) is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as the fifth category in Part II, General Coverage Series.

The description of the category delineates a system for analyzing the functions and actions of machine tools. It groups the machines into six families according to the manner in which each performs these functions.

The material describes a few of the typical types of jobs frequently found in this category suitable for performance without the use of sight. Like the jobs described in previous issues, those in this category have been observed and tested by a blind member of the staff of Division of Services to the Blind.

Other categories of job specifications are being prepared and will be forwarded to you at an early date. Additional copies of the handbook or any of its supplements will be furnished upon request. We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

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D. H. Dabelstein

Donald H. Dabelstein
ASSISTANT DIRECTOR

HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

GENERAL COVERAGE SERIES

Category GC-5

MACHINE OPERATIONS
(Metal Working Power Tools)

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The above list only partially represents the employment opportunities for blind persons in this category and specifications for others will be issued as circumstances permit. Additional jobs such as the following should be sought and all jobs must be carefully analyzed for suitability under the conditions found in a particular plant: Operations of (1) drill press, sensitive type (2) drill press, heavy duty (3) multiple spindle horizontal drill press (4) drill press, deburring (5) lapping machine (6) honing machine (7) surface grinder (8) deburring belt, Emery (9) hobbing machine (10) gear shaver (11) gear shaper (12) automatic lathe (13) semi-automatic chucking lathe (14) production types of milling machines (15) power hack saw, reciprocating and endless belt types (16) broaching machine.



HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

GENERAL COVERAGE SERIES

MACHINE OPERATIONS
(Metal Working Power Tools)

General Information Sheet

D. O. T. Alternate Titles for Machine Operators:

- a. Milling-Machine Operator (mach. shop) I: milling-machine hand; horizontal milling-machine operator; vertical milling-machine operator; milling machine operator, hand; etc., according to type of milling machine.

Milling-Machine Operator (mach. shop) II: a laborer.

- b. Turret-Lathe Operator (mach. shop): chucking-lathe operator; turret-lathe hand; turret-lathe-machine hand.

Screw-Machine Operator (mach. shop): screw-machine operator, hand.

Screw-Machine Operator, Semi-automatic (mach. shop): screw-machine operator, hand.

- c. Electrical Repairman (any Ind.): electrician, maintenance; electrician, repair; trouble man, electrical; wireman, trouble shooter, electrical.

Description of Job Category: The machines whose operations are to be considered in this category are those in which one or more cutters move with respect to the object being machined or are shaped in such a way that the resultant removal of the material gives the article the shape desired. For instance, the spindle of the lathe holds the work and revolves it against the cutter which is held by a saddle across the frame of the lathe and carries the appropriate controls for changing its position with reference to the work, and thus by the proper selection of motion and shape of the cutting tool, material is removed to attain the desired shape of the finished article.

Other machine tools may employ more than one cutter, held and manipulated to the work in many various combinations. In the extreme, there are found tools such as the grinder wheel where a myriad of small cutters are held in the binder in the form of a wheel. When this is applied to the surface of a piece of metal it removes some of the metal, cutting it into the form of fine metallic dust. Still greater extremity is the use of crocus cloth to polish the surface in myriads of

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cutters microscopically fine, bound to a strip of cloth which is then held against the rotating surface to be polished.

Other methods of shaping metals such as forging or pressing are not included in this category although they may be done by machine.

A machine tool may be thought of in terms of the combination of the four functions to be performed simultaneously in changing the shape of an object, through the cutting off of material. They are: (1) holding the work, (2) holding the cutter, (3) varying the cutting position with respect to the object, and (4) applying the power necessary to effect the cutting action called for as the change of position of the cutter with respect to the work takes place.

There are six basic machine tools, each identified by the way it combines and performs the four principal functions required. Nearly any machine tool, when analyzed with respect to the way it performs the four principal functions, can be classified as a member of one of the families of these six basic machine tools. Most machine tools may be classified in relation to the six basic tools being adaptations of the same. The six basic machine tools are: (1) drill press, (2) lathe, (3) milling machine, (4) shaper, (5) grinding wheel, and (6) power hack-saw. Nearly all modifications of any of the six basic tools are aimed at improving their accuracy, flexibility, and ease of performing certain specific operations or types of operations. The more this modification emphasizes particular specific operations, the more likely the machine will turn out to be semi- or totally automatic in its action and consequently perform a narrower band of activities. In the following paragraphs each of the six basic machine tools is identified by showing its arrangement of the four principal functions combined in each machine tool and by listing some of the major uses to which it is put. In each paragraph are also listed some of the more common adaptations which come within that family of machine tools.

- a. The simple drill press has a fixed table upon which the work is mounted. The cutting tool, a twist drill, is mounted in the end of the vertical spindle to the top of which the power is applied to rotate the drill. The vertical movement of the spindle and drill is accomplished by pulling on a handle which works a gear meshed with a rack, the latter being attached to the spindle housing, thus feeding the cutters down into the work and accomplishing the drilling of the hole. Drill presses are used for drilling holes and doing tapping operations where modifications have been made in

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the equipment. Special adaptors allow the drill press to make square holes.

Other members of the drill press family include the horizontal drill press; the vertical tapping machine; the multiple spindle drill press, which consists of a number of spindles mounted above a common flat table or smooth base so that the work held in a jig may be slid easily from one spindle to the next, each being adjusted to drill a particular place in the work. The gang spindle drill press consists of a number of spindles mounted above a common base which are fed simultaneously into the work producing a standard pattern of holes. This is used for drilling several holes at the same time in such pieces as cylinder heads and crank case castings. The gang spindle tapping machine is similar in its functions to a gang spindle drill press. A radial drill has a spindle mounted on a head which travels horizontally along a beam supported by a vertical column at one side, in such a way that the beam can be raised or lowered or rotated around the column. The head may be so mounted that it can be rotated around the beam or rotated in a plane parallel to both the axis of the spindle and the axis of the beam, thus the machine is able to drill a hole in almost any direction imaginable. It is usually used for drilling holes in large pieces of equipment and frequently in cases where many holes are to be drilled at different angles and positions. The internal boring machine consists of a table on which the work is mounted and a vertical boring bar with the tool mounted at the bottom end and the top end held in a horizontal beam with appropriate control mechanisms. This is usually used where the hole is too big to be trued up with a drill or reamer.

- b. Machine Shop Lathe. (Engine Lathe - Tool Room Lathe). The work is held by the head-stock spindle (sometimes with the assistance of the tail-stock) to which the power is applied to rotate the work against the cutting tool. The tool is mounted on a saddle or carriage traveling horizontally on the bed of the lathe and containing controls for varying the position of the tool with respect to the work. The principal uses for the lathe are the machining of inside or outside cylindrical surfaces or facing off the end of the work (producing a flat surface perpendicular to the axis of the work). It is also used for cutting spiral grooves to form threads. Members of the lathe family include hand screw machine, automatic screw machine, and horizontal and vertical turret lathes. In screw machines and turret lathes the single tool post is supplanted by a multiple position turret which will carry a number of

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tools set so that when in position they will perform identical operations on succeeding pieces of work. The automatic special purpose lathe, the wheel lathe (RR shops), the vertical boring mill with revolving work support table and a beam spanning the table to carry the tool-holding head and the feed controls, and the heavy duty floor lathes for large drilling are other members of the lathe family.

- c. **Milling Machines.** In this machine tool the rotating, multi-toothed cutter is mounted on an arbor shaft extending at right angles to the vertical column to which arbor shaft power is applied. The work is mounted on the traveling work table which brings the stock up to or across under the cutter. Its principal use is for producing flat surfaces or grooves of various types, including special contours produced by using specially shaped cutters such as gear cutters. The most common and basic type is known as the "knee and column milling machine." Herein a knee-shape casting carries the traveling work table and also moves up and down on the supporting column, out of the top of which the arbor shaft and supporting arm project to carry the rotating cutter. The universal type machine has a table mounting so constructed that the table can be swung around and fed at different angles. Other common types of milling machines include the manual types, such as the hand mill, semi-automatic and automatic mills, the rotating table mill, the double-ended pass-through type mill, the thread mill, gear mill, vertical mill, planer mill, spline mill, gear hobbing machine, gear shaver.
- d. **Shaper - Planer.** A shaper uses a single cutting tool mounted on a head carried on the end of a ram, to which power is applied to give a reciprocating, horizontal motion. The work is mounted on a box-like table supported on the front of the machine frame in such a way that it can be moved horizontally in a direction perpendicular to the center line of the ram, thus feeding the work past the cutter and thereby producing a horizontal surface. The tool holder on the head of the machine may be fed in a vertical or angular direction to give the vertical or angular surface desired. The cutting tool is similar to a lathe tool. The size of a shaper is designated by the size cube it will machine. In the metal planer, the work is mounted on a long, rectangular-shaped table to which the power is applied giving it a reciprocating motion. The tool is mounted in a head which in turn is supported on a beam straddling the table. The tool is fed vertically to produce vertical surfaces or, transversely along the beam, to produce horizontal surfaces. In the

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universal type planer the head may be set at an angle to produce angling surfaces. Planer sizes are designated by the maximum rectangular solid they will machine, for instance, 28x28x34 inches. The planer is used for producing flat surfaces, either vertical or horizontal, on work that is too long or for other reasons not suitable for performance in the shaper. Other members of the shaper family are universal shaper, key slotter, gear shaper. The planer beam may carry one, two, three, or more heads, each carrying a tool to perform a different portion of the work simultaneously. A number of short pieces may be laid end-to-end and fastened to the table and machined at the same time as though they were one piece.

- e. Grinder Wheel - Grinder Machine. The grinding wheel is a disk composed of a large number of very small cutters held by a bonding material in such a way that, when one becomes dull, it is automatically removed from the bonding material and other sharp cutters are brought into play. Power is applied to rotate the grinding wheel at a high speed; the work is mounted on the bed or frame of the machine often in such a way that the supporting mechanism also imparts the proper motion to the work with respect to the cutters. On other occasions the work is mounted stationary and the grinding wheel moves with respect to the work. Grinder machines are used for producing a fine finished surface and the removal of only a very small amount of stock at one time often brings the article down to an accurate dimension within very close tolerances. Some of the members of the grinder family are: outside cylindrical grinder with the work action and tool position being similar to a lathe; the inside cylindrical grinder with action similar to a boring operation. The surface grinder is a machine in which the work is mounted on a reciprocating table, passing back and forth under the grinding wheel, similar to that of a planer. Still other members of the family are: tool grinder, piston ring honer, centerless grinder, drill grinder, gear and thread grinders, cutter grinders, off-hand grinder, pedestal grinder (fine, for hand grinding of cutting tools), pedestal grinder, rough (coarse, for the free-hand holding of the castings or other items for removing flashings and other excess parts).
- f. Power Hack Saw. The power hack saw holds the work material in a vise on the frame of the machine. The cutters are in the form of teeth on the saw blade, which is mounted on a frame to which the power is applied to give it a reciprocating motion, and feed is usually by gravity due to the weight of

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the frame and other attached parts. The saw cuts a narrow groove, until one part has been cut off. This machine is used to cut off the lengths of stock from the larger pieces where only a rough dimension is required, often in preparation of material for further machining. The endless hack saw has a band of steel in the edge of which are cut the teeth that form the cutting tools. This band is mounted on two large wheels, one on either side of the work and so tilted, and the roller guide so arranged that the band will pass through the work in the same direction as the case of the reciprocation type power hack saw. Power is applied to one of the wheels. Another refinement of the power hack saw family is the Do-All or vertical band saw type of equipment which is frequently used for sawing irregular curved contours on one or a stack of pieces of metal or other materials. This particular machine may be equipped with a band carrying a series of short metal files for smoothing and finishing contoured surfaces to a close dimension.

D. O. T. Definitions

- a. Milling-Machine Operator: (mach. shop) I. Performs shaping, planing, and grooving machine work on metal objects, using a machine that cuts the metal with many-toothed, rotary cutters. Fastens work on table of machine with bolts or in a vise or special holding fixture. Selects appropriate milling cutters and clamps them in machine. Moves levers to select appropriate speeds of table feed and cutter rotation. Turns handwheels to bring work into position under cutter. Starts machine. Engages power feed or turns handwheels to feed work to cutter. Stops machine and verifies dimensions of work. Removes completed work from machine. May set up a dividing head on table of machine and use dividing head to obtain accurate spacing between cuts, as when machining teeth on gears. May be designated according to type of machine as Plane-Milling-Machine Operator.

Milling-Machine-Operator, Hand: (mach. shop) Does light precise machine work with a milling machine on which the table is fed toward the cutter by turning handwheels or cranks instead of by power feed so that the operator can sense the progress of the cutter by the resistance felt through the handwheels.

Milling-Machine Operator: (mach. shop) II. Finishes metal objects by performing such operations as leveling welding beads, cutting slots, and planing surfaces, using a fully

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automatic milling machine set up and adjusted by other workers. Places work piece on movable holding fixture. Turns handwheels to advance and retract holding fixture and tools, making cuts to depths established by machine set-up and performing simple highly repetitive operations on one type of product until lot is processed and machine set-up is altered. Requests required machine adjustments and repairs.

- b. Turret-Lathe Operator: (mach. shop) Shapes external and internal cylindrical surfaces of metal objects, such as castings or forgings, which are best machined when held in a chuck. The machine is semi-automatic, being equipped with a turret that can be set up to present each of the tools required for a cycle of machining operations to the work in sequence. May be designated according to make of lathe, as Jones and Lamson-Lathe Operator; Libby-Lathe Operator.

Screw-Machine Operator: (mach. shop) Sets up and operates a manually controlled screw machine (a type of lathe) to shape internal and external cylindrical surfaces of bars or rods of metal to produce screws, bolts, nuts and other parts where threads are usually cut with taps or dies. Inserts and adjusts tools in turret to perform desired operations as they are brought into contact with part. Clamps part in position and aligns it with cutting tools. Operates levers and controls, causing machine to perform in sequence the series of operations for which it is set.

Screw-Machine Operator, Semi-automatic: (mach. shop) Shapes internal and external cylindrical surfaces on metal objects that are made from bars or rods of metal (bar stock) with a semi-automatic lathe provided with a turret that can be set up to present each of the tools required for a cycle of machining operations to the work in sequence, and frequently equipped with an automatic bar-stock feeding device that keeps machine supplied with metal from which to make a succession of duplicate objects.

- c. Electrical Repairman: Keeps electrical equipment such as wiring, motors, switches, switchboards, and electrical mechanisms in good repair and operating condition. Performs various duties such as replacing defective wiring and making connections to new electrical installations, replacing burnt out fuses, replacing small parts on motors, cleaning and oiling motors, and repairing electrical fixtures. May make new installations of fixtures, motors, and other electrical equipment.

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May rewind and make major repairs to motors. May repair elevators.

Characteristics of Usual Worker: Workers of either sex are employed in this category. Where women are employed it is usually on long runs of light-weight items where the prime requirements are good manipulative ability, good hand-arm coordination, fingering and hand dexterity, uniformity of product and high speed of production; and where the set-up work and adjustments are performed by other persons. For heavier items and therefore heavier machine parts to handle or where there is frequent setting or resetting of the tools in the machine required of the operator, men are usually preferred. In production plants where the manipulative skill is the primary requirement and no knowledge of machine tool theory is required, a successful girl operator often becomes so well satisfied that she retains such a type of job for a long period of years. She may operate one type of machine for her entire industrial employment. The workers on these jobs seldom consider them as stepping stones to better paid jobs requiring higher technical skills. In some cases the pay may be very low approaching that of laborers; for instance, in a foundry, the operators of a grinding wheel may be classified as laborers and have little or no skill in the operation of other types of equipment.

Physical Requirements, Aptitudes and Abilities: In the case of many of the machine operating jobs, the actual manipulation requires only light muscular exertion but the working speed brings the frequency up so high as to take a considerable amount of physical endurance. In many cases where the articles weigh a considerable amount it is likely that the parts of the machines will also be heavier and therefore more physical exertion required for each motion. The end result will require workers with good physical capacity on these jobs. Frequently, the operator sits at the machine and practically all the work is done by the arms, shoulders, and hands. Workers that succeed best in this category are those with a natural aptitude for the handling and understanding of machinery, even though they do not develop any high technical knowledge or skill. The usual worker on this job must have ability to maintain a steady, monotonous pace without excessive physical or nervous exhaustion, the ability to coordinate all motions in the repetitive sequence and the ability to simultaneously detect any deviation in the noise or feel of the machine (handles and controls) which would indicate a change in the operating condition.

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It would be well to have a careful understanding of the terminology used in designating various workers on the machine tools. And for this purpose we quote from "Job Descriptions for Job Machine Shops," issued by the United States Employment Service. The term machinist is sometimes applied indiscriminately to all workers using machine tools. A distinction should be made between machinist, machine operators, and machine hands. A machinist, in the proper sense of the word, is one whose apprenticeship has trained him to set-up, adjust, and operate all types of machine tools although in practice he may confine his attention to the type of work in which experience has made him particularly adept. Given a blue print to inform him of the size and shape of a given object, he is able to plan a logical sequence of operations to produce that object.

Finally, he knows enough of metallurgy to know the effects of heat treatment on the brittleness and toughness of metal and the machinability of metals after they have undergone the processes. In direct contrast to machinist is the machine operator who specializes in operating one machine. He may not be required to serve a formal apprenticeship, rarely decides upon the methods of machining a piece of work and, in some shops, needs not set up or maintain the machine he operates. The machine hand occupies a position somewhere in between machinist and machine operator. Although he is familiar with the details of setting up, operating and maintaining one type of machine tool, he has not the all-around knowledge and skill of the journeyman machinist. In small job shops, the work is usually done by machinists who are sometimes assisted by helpers who are able to do all the machining operations on a given job from start to finish. In a strictly production shop, however, metal parts are usually passed from one machine operator to another, each operator assigned to do a single routine operation on each piece. Besides machine operators, there are assemblers who fit parts together to construct pieces of machinery or equipment.

Specialization in a production shop may be so far extended that the machine operators are simply machine tenders who feed the machine and gauge the dimensions of its work while problems of adjusting the machine and grinding cutting tools are in the hands of machinists. Between small job shops and highly specialized production shops there is all manner of variations. In some jobs and semi-production shops, most of the workmen are journeymen machinists even though their work may be confined exclusively to one machine; in others, virtually

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all operations are carried out by machine hands. Many of the larger job and semi-production shops, in which the work is done primarily by machinists, gain some of the advantages of specialization by assigning the task of setting up the machines, operating them, and grinding the tools to separate individuals. In a few shops the machinists are rated as first, second, and third class, depending upon their skill and experience. A separate classification common among machine shop workers is that of tool and die-maker, a highly skilled machinist who makes and repairs dies, cutting tools, gauges, and work-holding fixtures. The journeyman machinist usually gains a considerable portion of his knowledge and experience from being an apprentice working with the skilled machinist who teaches him certain parts of the trade, while some of his time is also devoted to classroom work on technical matters connected with the machinist trade. Machine operators do not come within this system of learning.

Training and Preparation Procedures: Persons coming to work as machine operators may have had no previous training on machines or may frequently have been working as helpers around similar machines. The new worker coming on the job is trained by a lead man, foreman, or training specialist. The new worker is instructed by the foreman, lead man, or training specialist first on one of the simpler drilling or hand milling operations. The careful training and supervision continues until he has fully mastered the procedures or until the new worker's ability to master this type of work has been demonstrated. As the worker builds up skill on the simpler operations and demonstrates further ability, he may be advanced to more complicated operations on the first machine or he may be moved to other more difficult machines where greater responsibility and skill are required. In some cases, it has previously been determined that a certain amount of time is sufficient for a new worker to come up to full mastery of the operations and to build up to the normal working speed. This may vary from one or two days up to six, seven or eight weeks, according to the operation. In other plants, it is left up to the foreman to judge whether he has the ability and can come up to full performance required on the particular operation. The same judgement may be applied to determine whether the worker should be advanced to better positions. In some cases, the worker may develop a special skill on a particular machine operation and desire to remain steadily on that particular position year after year.

In some special circumstances a new worker may have an opportunity to attend formal classes in a school set up for the development of machine operators only without the technical details given those

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who expect to become machinists. These special classes may be set up or sponsored by the employer or may be a community activity in case the employment conditions warrant it, such as an acute labor shortage in the area of an important industry.

Safety Precautions, Health Conditions, Hazards: One of the most important safety precaution requirements in working around machinery is the wearing of proper clothing. The worker should wear a short-sleeved shirt; remove his wrist watch, rings, and necktie, and avoid baggy or loose clothing. For many types of machines, it is essential that the worker wear a cap or net to completely encompass the hair. This especially applies to the case of women operating drill presses. Gloves should not be worn even to prevent slight lacerations since the glove itself might be caught and cause a greater damage. For some machines, especially grinding wheels, safety glass goggles should always be worn at any time the worker is operating the machine. Operating safety procedures will vary with the type of machine and the set-up. For instance, the chucking lever should never be loosened until the machine has come to a complete rest. The piece should never be removed from a vise or fixture until same is moved back well out of the way of the cutter. Where the object being handled is heavy, precautions should be taken not to pinch fingers when it is being placed on a table or floor and in many cases safety shoes should be worn. Precautions should be taken to feed the tool gently into the work to avoid its grabbing too deep a first cut, which might result in broken tools and pieces of tools or equipment flying through space and hitting and injuring the operator or other workers.

These jobs do not usually develop any bad health conditions. Fumes from the cutting oil or other liquids may be somewhat obnoxious at first. The oils themselves may cause skin rash. Standing on cement floors all day may bother feet and legs, in which case special crepe-rubber soled shoes may help or a floor mat may remove the difficulty. Hazards in this category come mostly from improper clothing, the failure to wear goggles, and the wearing of rings and watches. Other hazards come from such things as attempting to adjust the oil tube or brushing away shavings while the cutter is in motion. In some situations, hazards exist from pieces falling off the table or machine and mashing toes. When machining certain light-weight metal and metal alloys, there may be hazards from the spontaneous combustion of the fine dust coming off the metal itself.

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Industries Where This Category is Frequently Found: This category is found in practically every industry making items with metal parts. Plants making articles with only a few metal parts may purchase these from another manufacturer specializing in such work. An example would be the purchase from an outside source of the bolts, washers, and nuts required to hold a product together. Large organizations, on the other hand, may have their own departments for making such small standardized parts. For instance, a refrigerator or automobile manufacturer may buy hinges and locks from a company specializing in that type of product. Plants making castings or stamped articles from sheet metal may also have a department partially machining the castings. Plants specializing in the production of medium and small-sized gears may have an operation of deburring on a belt sander and may find that a number of their gear cutting machines may be operated without the use of sight.

Jobs Usually to be Avoided Although Seemingly Suitable: Almost any job in this category may, upon occasion, be found linked up with conditions which make it unsuitable for performance without the use of sight. Automatic or semi-automatic machines frequently seem suitable at first but usually upon closer check it is found that the inspection of parts by sight and the movement of shavings or other items coming off the machine must be observed frequently to determine whether or not the machine is functioning properly. Sometimes the surface texture of the product being made indicates whether or not the automatic equipment is working properly. Also, in case of measuring devices the blind worker may be handicapped and require that the gauges be converted so that they can be read by touch. Reamers and heavy drills are usually to be avoided.

MILLING-MACHINE OPERATOR

1. Name Used for Position in Plant Surveyed: Mill Hand

D. O. T. Titles: Milling-Machine Operator (mach. shop) I
Milling-Machine Operator, hand (mach. shop) I
Milling-Machine Operator (mach. shop) II

Codes: 4-78.031 I
8-78.10 II

Alternate Titles: Milling-machine hand; milling-machine operator,
hand feed; mill operator, hand.

D. O. T. Definitions: Milling-Machine Operator (mach. shop) I.
Performs shaping, planing, and grooving machine work on metal objects, using a machine that cuts the metal with many-toothed, rotary cutters. Fastens work on table of machine with bolts or in a vise or special holding fixture. Selects appropriate milling cutters and clamps them in machine. Moves levers to select appropriate speeds of table feed and cutter rotation. Turns handwheels to bring work into position under cutter. Starts machine. Engages power feed or turns handwheels to feed work to cutter. Stops machine and verifies dimensions of work. Removes completed work from machine. May set up a dividing head on table of machine and use dividing head to obtain accurate spacing between cuts, as when machining teeth on gears. May be designated according to type of machine, as PLAIN-MILLING-MACHINE OPERATOR.

Milling-Machine Operator, Hand (mach. shop) I
Does light, precise machine work with a milling machine on which the table is fed toward the cutter by turning handwheels or cranks instead of by power feed so that the operator can sense the progress of the cutter by the resistance felt through the handwheels.

Milling-Machine Operator (mach. shop) II.
A laborer. Finishes metal objects by performing such operations as leveling welding beads, cutting slots, and planing surfaces, using a fully automatic milling machine set up and adjusted by other workers. Places workpiece on movable holding fixture. Turns handwheels to advance and retract holding fixture and tools, making cuts to depths established by machine set-up and performing simple highly repetitive operations on one type of product until lot is processed and machine set-up is altered. Requests required machine adjustments and repairs.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MILLING-MACHINE OPERATOR (Cont'd)

Items Worked on in Plant Surveyed: Instrument parts such as stainless steel divider points (made on hand screw machine) -- diameter 5/32", length 1" and 1-5/8"; divider arms; slotted head screws; shafts with flat milled places and keyways cut. These items may be made from brass, steel, stainless steel, copper, aluminum, bakelite, or other materials.

2. Usual Operator:

a. Sex: Male or female

b. General Characteristics: Any size, nimble, quick, steady. Temperament suitable for rapid, continued repetitive machine operations. Sensitive touch, good orientation within arm's reach. Ability to sense by the feel of the handle the progress of the cutter and nature and characteristics of the work being performed.

3. Physical Demands:

a. Activities: Walking, standing, turning, sitting, reaching, lifting, carrying, fingering, handling, feeling, working speed.

b. Working Conditions: Inside, odors, noisy, adequate lighting, adequate ventilation, vibration, mechanical hazards, moving objects. Working around others, working alone.

c. Skill Required: This is a semi-skilled job except that when the operator is required to reset, adjust, or make the original setup it becomes a skilled operation. It is essential that the operator have good hand, arm and foot coordination and good fingering of small parts to swiftly manipulate them and feel when the part is properly seated in the vice cavity. The operator must become skillful at interpreting from the feel of the handles and sound of the cutting action the condition of operation. Accurate space orientation within arm's length and precise timing will be essential if the best production is to be obtained. If the operator is required to reset the machine and maintain adjustments, he will need skill in the reading and use of micrometers and feeler gauges as well as a knowledge of the principles of operation of the machine tool.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MILLING-MACHINE OPERATOR (Cont'd)

4. Details of Physical Activities: The worker may stand at this position all day. Walks a distance up to ten feet to secure or dispose of items worked on. Turns one direction to secure new pieces and the other direction to dispose of completed parts in trays. If women are used on the job, they usually prefer to sit. From this sitting position they will be able to reach for or dispose of parts. May turn and walk several steps to place a loaded tray on a truck or secure a tray of unfinished parts which weigh up to twenty pounds. Fingers small parts or handles larger parts in securing them from the tray and in properly placing them in the holding fixture or vice on the machine.
5. Details of Working Conditions: Works inside and around others in well ventilated, usually well lighted surroundings which are moderately dirty from metal chips and the splashing of cooling liquids where used on cutting tools. The room is usually noisy from the operation of a number of similar machines but necessary conversation can be carried on with a moderate amount of difficulty. Occasionally there is noticeable vibration from heavy machines. Moderate or slight odors caused by cooling oils on hot cutting tools. Mechanical hazards only from improper handling of the machine. Hazards from moving objects only when there is lack of attention in travel.
6. Hazards: There is no particular hazard in the operation of these milling machines if all four points of the safety pattern are established and carefully adhered to. Cutters are frequently not shielded unless cooling liquid is continuously running on them. The machine control handles, switches, and supply of work are usually located so that they keep the operator's hands away from the cutter. On most machines it is easy to establish a safe path for the hands to the collar or other indicating points for determining the state of rotation. Short sleeved shirts should be worn and ties or other loose pieces of clothing should be removed. There could be some danger of pinching the fingers in an air chuck if good timing and coordination are not maintained.

7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. With the right hand picks point from small metal pan on the table of the machine and inserts it blunt end foremost into the

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MILLING MACHINE OPERATOR (Cont'd)

vice jaws, pushing it to the left as he shoves it forward until the end comes against the shoulder. Then clamps piece in position by firmly pushing down on foot control to operate air chuck.

- b. Pulls up on the right hand lever rapidly to move the work under the cutter, (if short points are being milled, the table has already been locked in the proper forward position) at the same time starts moving the left hand lever down to lower the cutter on to the work. The stroke is rapid at first and slows down as the cutter contacts the work gently and is depressed the full depth of cut. (Caution must be exercised here so that uniform pressure against the stop is obtained each time in order to give a uniform dimension.)
- c. Pushes down on right hand handle to move the table back toward the operator, causing cutting of slot in the remaining length of the pin. As soon as the cutter leaves the material, the motion is accelerated and with the left hand lever raises the cutter head simultaneously returning both cutter head and table to the loading position.
- d. Grasps the point with the left hand and touches the foot control to open the chuck. Places the pin in pan at the left while securing a new point with the right hand. (Note: When short pins are being milled they are allowed to drop directly into a pan without being handled, the left hand remaining on the vertical feed control handle, while the right hand secures another pin ready to repeat the operation.)

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Nichols Production Hand Mills equipped with air operated foot control vice, or hand vice in some cases. Machines have left and right hand handles approximately 18" long for controlling the vertical and horizontal feeds respectively. These give a rapid travel and a direct sensitive feel of the operation of the cutter. The tables may also be adjusted for height. Two adjustable stops are provided in each case for limiting the vertical and horizontal travel. Machines are equipped with circulating pumps for cooling liquids and catch pans and splash guards are used when required. May add air hose for blowing out chips. Chairs are available so that the operator may sit when using foot control on air chucks or feeding small parts.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MILLING MACHINE OPERATOR (Cont'd)

- b. Set-up and Maintenance: All set-up and maintenance and placement of cutters, etc. is accomplished by the plant set-up man.
 - c. Modification: None.
9. Equipment Variations Which May be Found in Other Plants: Hand mills are essentially the same in all cases but there is a wide variation in the design and arrangement of clamping devices for holding the work according to the judgment of the plant set-up man and the articles being worked on. Air operated devices may be hand or foot controlled. A brush may be used instead of air for removing chips.
10. Usual Pre-employment Training: Frequently workers start in on the simpler operations of these machines without previous formal training although some shop training and familiarity with machinery is desirable.
11. Usual Training Procedure on the Job: Usually the foreman or the leadman in a particular section starts a new worker on the simpler jobs where the least skill is required. Functioning of the main parts of the machine is carefully outlined and each step explained and practiced separately. At first practice operation is under constant supervision which is gradually relaxed as proficiency is developed. The checking of day by day operations then becomes the duty of the set-up man. As the worker becomes more skillful, increasingly difficult operations may be assigned.
12. Any Training Deviations Suggested for the Blind: Before being started on an operation of this type in the factory, the blind worker should be given some training and a small amount of experience in the operation of power tools with special emphasis on the necessity for following a definite safety pattern in their operation. In starting the blind worker on a machine, he should be given an opportunity to observe all parts, actions and controls. Also a definite safety pattern should be worked out and the worker thoroughly acquainted with it. As he continues with his practice and operation, occasional checks should be made to see that he is carefully following the safety pattern.
13. Production
- a. Yull: Long divider points 200 per hour; short divider points 400 to 500 per hour.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MILLING MACHINE OPERATOR (Cont'd)

- b. Time to Reach Normal Efficiency: An experienced worker may come up to full production in one to three hours. An inexperienced worker starting on a simple operation may take as long as six weeks to reach full production and efficiency.
14. Interrelation with Preceding and Succeeding Jobs: Usually there is no close interrelation with preceding or succeeding jobs. The general daily production must be maintained, however, in order to have the proper supply for meeting demands of other machines in the plant.
15. Teaming with Other Workers: Usually none, this being a job on which the worker operates entirely alone.
16. Modification, Deviation, Special Tools for the Blind: None usually required.
17. Sight Requirements and Conditions:
- a. Vision Required for the Job: None -- unless visual inspection is required for proper placing according to ink or color marking.
- b. Conditions Affecting the Suitability of a Particular Job: If material is not brought to the job by floor worker, some travel vision may be required to obtain articles to be worked on. Check should be made to ascertain requirements for tallying the number of items completed.
18. Avoid the Following Conditions: Long travel to secure or to dispose of work, visual inspection of surface finish at completion of operation, tallying of time sheets or obtaining of assignments of new jobs through notations on work cards.
19. Other Jobs Often Combined for Full-Time Employment: A milling machine operator may often be required to operate other machine tools such as drill press, lathe, power grinder and turret lathe in order to keep busy full time. May also be switched to bench work such as filing, deburring or assembling.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found: This type of operation is found in plants making various types of instruments, equipment parts such as fuel pumps or ignition systems, or other small items where a high degree of accuracy is required. Many of these same parts might be milled on automatic machines if quantities are large enough to warrant it.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

SCREW-MACHINE OPERATOR

1. Name Used for Position in Plant Surveyed: Hand Screw Machine Man

D. O. T. Title: Screw-Machine Operator, Semiautomatic (machine shop)

Code: 6-73.144

Alternate Title: Screw-machine operator, hand

D. O. T. Definition: Shapes internal and external cylindrical surfaces on metal objects that are made from bars or rods of metal (bar stock) with a semiautomatic lathe provided with a turret that can be set up to present each of the tools required for a cycle of machining operations to the work in sequence, and frequently equipped with an automatic bar stock feeding device that keeps machine supplied with metal from which to make a succession of duplicate objects.

Items Worked on in Plant Surveyed: Brass bushings and similar parts and items made from brass rod, such as (a) knurled thumb nut contoured with a radius and drilled and tapped for 6-32 screw; (b) brass flanged bushing externally threaded, center drilled to form a 3/8" diameter blind hole and center again drilled to a 1/64" through hole.

2. Usual Operator:

a. Sex: Male or female

b. General Characteristics: Any size, nimble, quick, steady. Temperament suited for rapid, continuous, repetitive machine operations. Good orientation within arm's reach. Ability to visualize sequence of operations and good feel to determine through control handles the detailed progress being made on each step in the operation.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, carrying, pushing, pulling, handling, fingering, feeling, talking, hearing, working speed.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

SCREW-MACHINE OPERATOR (Cont'd)

- b. Working Conditions: Inside, dirty, odors, noisy, adequate lighting, adequate ventilation, vibration, mechanical hazards, moving objects, working around others.
- c. Skill Required: This is a semi-skilled operation where the worker is required to merely master the manipulation of the controls without exercising judgment as to quality of work or the making of adjustments. Increased skill will be required when duties such as inspection of the product and judgment as to the operating condition of the cutter and the machinery is required of the operator. It will be considered a skilled operation when the setting up, checking, and adjustment of the tools are added to the responsibilities of the operator. Both sighted and blind operators develop skill in the operation and handling of levers and other controls and in judging the action of the cutters by the feeling reflected onto the handles of the chief controls. In addition to this skill the blind operator must also be able to interpret the various sounds incident to the action of the cutting tools and other parts of the machine. In some situations the setting and reading of micrometers and other measuring instruments will be of great importance. The setting of tools will require good skill at visualizing their form and the results to be obtained when applying a particular tool to the work being done.
4. Details of Physical Activities: The worker stands at the operating position all day except when loading the machine or disposing of trays of finished articles. Stoops and turns to move tray loaded with finished items from the machine to the position by the aisle from which it is transported to some other part of the plant. Walks along feed pipe, extending from the head of the machine a distance of approximately twenty feet, to reload the tube with bar of material. Lifts one end of bar stock exerting a force equivalent to twenty or twenty-five pounds pull and inserts the end of the stock into the end of the feed tube. Walks up to ten feet farther along the bar stock and lifts it again to continue inserting the stock in the feed tube. May have to carry the end of the stock several steps from where it was unloaded on the floor. Pushes and pulls handles of machine singly or, when possible, two of

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

SCREW-MACHINE OPERATOR (Cont'd)

them simultaneously to operate the equipment through its established cycle. At times this requires careful, close coordination. Picks small parts to place them in the chuck, to retrieve them from the shavings, or to place them in a carrying tray and, when possible, simultaneously feels the contour in order to determine that the item is being properly formed by the machine. Talks occasionally with foreman and other workers to receive or to give instructions or information in connection with the work being done. Listens to the noise made by the machine in order to have an additional check on its operation. Operator must maintain a steady, high working speed, keeping both hands busy simultaneously whenever possible in order to meet the usual competition in this industry.

5. Details of Working Conditions: Works inside in a comfortable, well lighted, well ventilated room. Noise and odors of cutting oil from a number of other machines being operated in the same room. Room slightly dirty from oil and chips of material cut from the stock. Vibration, depending upon the size, weight, and speed of machines operating in the room. Mechanical hazards are very slight since practically all moving parts of the machine are enclosed and both hands are required on the operating handles of the machine almost constantly. Also the four point safety pattern can be easily applied to further reduce any hazards. The only moving objects are hand trucks travelling through the aisles which are usually separated from the working positions by stacks of lugs. Fellow workers are five to fifteen feet away from the machine operator and within shouting distance if information or assistance is required.
6. Hazards: There are no serious or special hazards involved in operating this machine with or without the use of sight providing the four point pattern of safety is carefully applied and rigidly adhered to. The rules for safe dress on the job must be strictly observed. Slight lacerations may be sustained if the operator is required to catch items as they are parted off from the stock or when the work must be set into the collet chuck while it is running. If turret is to be rotated through unused spaces directly by hand, care must be taken to grasp it in such a way so that no cuts will be obtained from the sharp tools mounted in the other spaces.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

SCREW-MACHINE OPERATOR (Cont'd)

7. Sequence of Steps in Position in Plant Surveyed: When making the knurled thumb nut starting with the machine loaded with stock and the tools properly set, and with the turret head in place to bring the distance stop in alignment with the end of the stock protruding from the collet, the worker;
- a. With the right hand pulls turret travel lever to move it up approximately the full distance at which time the left hand releases the chuck lever allowing the air pressure to move the stock up against the end of the stop. Following this the right hand pulls the turret up through the rest of the travel distance pushing the stock back to exactly the length desired at which time the left hand pushes the chuck lever closing the collet.
 - b. With the right hand pushes the lever travelling the turret to the extreme right indexing the center drill into position. Pulls on the travel lever bringing the turret up rapidly until the center drill almost touches the work. Feeds turret in slowly as far as it will travel. Simultaneously with the drilling operation, with the left hand pushes cross feed lever forward bringing the forming tool against the work to form it in the proper shape.
 - c. Travels the turret to the extreme right indexing the tap drill into position. Moves turret forward slowly to feed it into the work and backs it out several times to clear the chips until the hole has been drilled to the full depth. During this interval continues to hold the forming tool on the cross feed firmly against the work completing its formation.
 - d. Indexes tap into position and simultaneously with the left hand puts the machine into low speed. Continues feeding the tap in at correct speed until approximately the full depth of the hole has been threaded. Shifts machine into neutral and then immediately into reverse to back the tap out, the turret being moved to the right at the proper speed to keep up with the tap.

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SCREW-MACHINE OPERATOR (Cont'd)

(Note: The proper feed speed must be maintained carefully in both tapping and backing out of the hole in order not to damage the threads. The tap will automatically release when it comes to the bottom of the hole. Better results are obtained if the machine is thrown into neutral and the tap allowed to coast the last couple of turns.)

- e. Indexes turret to bring the facing tool into position, simultaneously pushing direction lever into forward and speed lever into high.
- f. Indexes knurling tool into position simultaneously moving speed lever into low position. Moves turret head until knurling operation has been completed.
- g. Moves turret head to the right indexing the distance stop into position again, simultaneously throws speed lever into fast. Pulls cross feed lever back parting off the knurled thumb nut which drops into a pan below the lathe.

When making the flanged bushing and starting with the machine loaded with 3/4" brass stock, the tools mounted on the turret head and cross feed, and the distance stop on the turret head indexed into position, the worker;

- a. With the right hand pulls turret travel lever to move it up approximately the full distance at which time the left hand releases the chuck lever allowing the air pressure to move the stock up against the end of the stop. Following this the right hand pulls the turret up through the rest of the travel distance pushing the stock back to exactly the length desired at which time the left hand pushes the chuck lever closing the collet.
- b. Indexes roughing tool into position and feeds roughing tool along the work as far as the distance stops will allow.
- c. Indexes finishing tool into position and feeds it across the work as far as the travel stop will allow. (Note: Care must be taken to always keep this feed uniform in order to maintain close tolerance to a half a thousandth.)

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MACHINE OPERATIONS
(Metal Working Power Tools)

SCREW-MACHINE OPERATOR (Cont'd)

- d. Indexes center drill into position and moves it into the work feeding it at the proper speed until the travel stop has been reached.
- e. Indexes 3/8" diameter drill into position continuing to feed drill to depth provided by travel stop. (Note: A uniform pressure should be maintained on the handle when completing the drilling of each hole in order that the proper depth may be kept uniform. The drill should be backed out several times to clear it of chips.)
- f. Indexes geometric die into position and simultaneously puts speed lever into low. Moves die up to put on an external thread feeding at a uniform speed as required by the thread. (Die releases itself at end of travel.) Pushes feed handle to the right in order to remove the die from the work. (Caution: It is essential that the feed speed be kept uniform and in time with the advance of the die itself in order to assure a good thread.)
- g. Moves turret to the right indexing distance stop into position for next cycle and simultaneously resetting the geometric die after which the speed lever is moved to fast position. Pulls the cross feed lever forward bringing the parting tool into action and cutting the bushing off the stock whereupon it drops into a pan.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: The machine is a Hardy Hand Screw Machine 1" capacity, meaning 1" diameter maximum size material handled through the head and collet type chuck. It is equipped with pneumatic feed tube for moving the rod in automatically, operating as indicated above. The cross feed slide has provisions for mounting tools at each end. The turret head has six positions and travel is obtained by pushing or pulling on a horizontal feed lever. All belts and gears are enclosed. There is one speed change lever and one for changing direction of rotation. (Change of direction may be accomplished with only a slight hesitation at the neutral position.) The machine is equipped with brakes for obtaining a quick stop when the speed

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

SCREW-MACHINE OPERATOR (Cont'd)

change levers or clutch are used. Shields are provided for controlling the splash of the cutting oil when it is used. There is a circulating pump for forcing the cooling liquid through the nozzle. A machine may be equipped with a pot chuck or expanded collet chuck when the piece to be worked on is larger than 1" in diameter.

- b. Set-up and Maintenance: The set-up of the tool and cycle of operation and the maintenance of the tool are the responsibility of the plant set-up man. At intervals he inspects the machine operation and checks the parts being made. The operator may also be expected to know from the feel of the way the tools are acting whether or not they need sharpening or replacing, in which case he will call for the set-up man. The operator reloads the machine by inserting the bar stock into the back end of a long tube projecting from the head of the machine, following it with a loose fitting plug or plunger, and recapping the end of the tube. A valve is adjusted to admit air between the cap and the loose fitting plug thereby forcing the latter up against the stock and automatically pushing the stock ahead when the collet chuck is loosened. The amount of air admitted behind the loose fitting plug determines the pressure at which the stock is forced up against the distance stop on the turret head.

- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Hand screw machines and turret lathes found in other plants may be almost exactly like the one described here or vary in any or all of the details. Sometimes even for the primary operation the work may be inserted one piece at a time in the collet chuck. This may require that the head be shut down and brought to rest before the chucking operation takes place or the piece may be inserted in the collet without stopping. Some machines will be fitted with a holding device on one of the turret positions for the purpose of inserting the piece in the collet chuck. Collet chucks are provided when necessary for holding odd shaped items. The tightening of the chuck may be by compressed air instead of by hand. Some machines are equipped with a four spoked wheel for traveling the turret. This allows

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MACHINE OPERATIONS
(Metal Working Power Tools)

SCREW-MACHINE OPERATOR (Cont'd)

one handle to be selected as the indicator and its position and motion compared with that of the hour hand of a clock when referring to the location in which some operative change takes place. For example, if this reference handle is at three o'clock, it may indicate that the threading die is about to engage the work, etc. Some turret lathes are equipped with lead and feed screws so that feeding of the tools to the work is accomplished by power instead of by hand. Other turret lathes have semi-automatic controls whereby the head operation such as stopping, starting, chucking, speed changing, and reversing are done by electric controls which are actuated by the turret carriage and thus coordinated with its motion. Collet chucks are available for almost any shape of stock desired, such as hexangle, square, rectangular, oval, or round. In some machines the bar stock is fed through the head by means of a friction drive controlled by a handle on the outside, or, if no power feed is available, it may be necessary for the operator to reach behind the head and pull the stock into position himself.

The clean up of shavings and oil around the machine may be the duty of the operator, or at least he will keep the upper part of his machine brushed free and leave the cleaning of the pan underneath to a floor service man. The operator may "tear down" one job and "make ready" for the next one, and the plant set-up man then will complete the final adjustment of the tools and be responsible for the operation starting off correctly. The operator may be required to make certain routine adjustments as in the case of producing a cap screw. Every so often he must check the dimensions of the thread by using a thread gauging micrometer and then make readjustments in the geometric die to bring the product within the required tolerance.

10. Usual Pre-employment Training: Pre-employment training is usually required when the worker has had no experience on simple machines such as a milling machine, drill press or engine lathe. If the operator is to be required to do rough or finished set-up and/or use micrometers and other measuring equipment, it may be necessary that he have more extensive work experience and some vocational trade training or its equivalent.

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MACHINE OPERATIONS
(Metal Working Power Tools)

SCREW-MACHINE OPERATOR (Cont'd)

11. Usual Training Procedure on the Job: The foreman, set-up man, or group leader may be the person responsible for the on-the-job introductory training. This training will consist of a careful explanation of each task involved in the job such as what is to be done, how, why and the precautions necessary to insure the safety of the worker in the correct performance of the operation. In some plants the first introductory training will be given in another department separate from the regular production work and then the trainee put on the production line. The follow-up training on the job varies in length and type according to how rapidly the new worker develops toward full competence. If this training and follow-up responsibility has been that of a special trainer, it is gradually shifted to the group leader or section foreman.
12. Any Training Deviations Suggested for the Blind: Before a blind worker is placed on a hand screw or similar machine, he should have had careful basic machine operation training in a vocational trade school or its equivalent in shops other than the one of the contemplated employer in order that it may not appear that additional training is needed because of blindness. Previous training should be broader than that given a sighted machine operator in order that the blind worker would be immediately available and capable of being transferred, on an emergency basis, to the operation of other machines in the plant. Any interruption of employment for the purpose of re-training a blind person might be construed by the employer to be a sign of inadequacy on the part of all blind workers. Caution should be exercised in disclosing this additional preparatory training so that the employer will not be inclined to give the blind worker less on-the-job training or expect him to reach full production in a shorter period of time than would be the case with the new sighted worker.
13. Production:
 - a. Full: Variable according to product and set-up. In most plants great emphasis is placed on the net quantity of items produced, i. e., the total production minus the number of defective units per day. In

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

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SCREW-MACHINE OPERATOR (Cont'd)

addition to the worker's speed and uniformity of action, the production is definitely affected by the layout of the sequence of the operation and careful setting and adjustment of the tools. If by using both hands at the same time the worker can accomplish two operations at once, a considerable percentage of the time may be saved. For instance, if there are eight operations -- two on the cross slide and six on the turret head -- and, if one of the cross slide operations can be carried on simultaneously with the operation of one or more steps on the turret head, one-eighth of the time is saved amounting to a corresponding increase in production. Uniformity on the part of the operator in the speed of feeding the tools to the work and in the pressure placed against the distance stops in each step is an important factor in maintaining accuracy and reducing the number of defective articles produced. In order to keep the tools cool and sharp there is often a flood of cutting oil pumped over the tools and work at the point of operation. (It is important when surveying the job that some alternative method be found whereby the blind operator can determine that the cooling liquid is or is not flowing.)

- b. Time to Reach Normal Efficiency: One of the greatest factors having a bearing on the time required to reach full production is the number of steps included in the over-all cycle of operation. A set-up with only two or three steps can be mastered in less time than one with eight or ten to be remembered. Another factor affecting net production may be the delicate accuracy necessary to keep within the required tolerance. For instance, a light, fine threading job will usually require considerable practice until the operator develops skill in feeding the die in at the proper speed to obtain the correct lead and form of thread. An operator's degree of aptitude for this work may be a big factor in the time required to learn it. Some workers who are good on other machines may not be able to effectively master the turret lathe at any time. The learning curve may not always be smooth. The operator may progress slowly, then suddenly swing into good rhythm and high production. The time required for various persons to learn the operation and to reach full production varies from three to

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eight weeks.

14. Interrelation with Preceding and Succeeding Jobs: There is usually no close interlocking relationship between preceding and succeeding jobs so far as production is concerned. Usually parts may be easily stored in the carrying trays so that a good supply is always available to the succeeding worker. Imperfectly made parts may cause some trouble to the succeeding operators.
15. Teaming with Other Workers: There is seldom any joint action with other workers required in the performance of this job. However, in the case of a blind person there may be some teaming with an adjoining sighted worker in the securing of supplies or to dispose of work already completed. (Caution must be observed in making these arrangements to be sure that there is no extra burden placed upon the sighted worker.)
16. Modification, Deviation, Special Tools for the Blind:
In tooling up of the machine and determining the sequence of steps, there are usually no modifications or deviations necessary because of blindness. If dimensions are to be checked, the blind operator may need specially calibrated micrometers which he can read by touch. It may be necessary to identify fixed gauges by filing notches in a suitable place or attaching a Brailled metal tag.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None under most circumstances.
 - b. Conditions Affecting Suitability of a Particular Job:
 - (1) For the totally blind: Situations where any feed control must be returned to or brought into line with an indicator on a dial. Situations where the surface must be inspected to be certain that its visual appearance meets required standards. Travel to obtain supplies or to dispose of finished products.
 - (2) For the partially sighted: Situations where close up inspection of dial or indicator readings must of necessity be made while the machine is in motion.

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SCREW-MACHINE OPERATOR (Cont'd)

18. Avoid the Following Conditions: Situations where the operator is required to read time cards, job assignment cards, or lot direction cards in order to receive instructions as to how the new job is to be done; where close inspection for color, finish or matching is required. Situations where there are dangerous and changeable travel conditions for obtaining or taking away material or parts. Any situation where the four point safety pattern cannot be applied favorably in all of its parts.
19. Other Jobs Often Combined for Full Time Employment:
This worker may be required to operate almost any machine in the plant. Also he may be transferred to bench work such as deburring and gauging which might be done simultaneously at the point of machine operation or separately on a table or a workbench.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found: This job is frequently found in companies doing screw machine work, the making of plumbing fixtures and parts, custom built parts for other machines, stamping companies who need turned items to go along with their formed articles, job machine shops that consistently have semi-production quantities to work on, where the runs are sufficiently long to justify an operator and set-up man.

MACHINE OPERATIONS
(Metal Working Power Tools)

ELECTRICAL REPAIRMAN

1. Name Used for Position in Plant Surveyed: Handy Man, Electric Shop.

D. O. T. Title: Electrical Repairman (any industry)

Code: 4-97.420

Alternate Titles: Electrician, maintenance; electrician, repair; trouble man, electrical; trouble shooter, electrical; wireman.

D. O. T. Definition: Keeps electrical equipment, such as wiring, motor switches, switchboards, and electrical mechanisms, in good repair and operating condition: Performs various duties, such as replacing defective wiring and making connections to new electrical installations, replacing burnt out fuses, replacing small parts on motors, cleaning and oiling motors, and repairing electrical fixtures. May make new installations of fixtures, motors, and other electrical equipment. May rewind and make major repairs to motors. May repair elevators.

Items Worked on in Plant Surveyed: Copper segments for drum type controllers used for starting, stopping, and speed control of electric motors on hoists and other types of heavy equipment; segments made from copper bar stock 3/16" to 1/4" thick by 1/2" to 3" in width. Magnet feeds cable connectors. Blown cartridge fuses, fifteen different sizes and types. Hinge pins to be drilled.

2. Usual Operator:

a. Sex: Male only

b. General Characteristics: Medium to large size; average physical strength. Able to work continuously and satisfactorily without "supervision". Aptitude and good ability for the accomplishment of work with hand tools as well as power tools.

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MACHINE OPERATIONS
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ELECTRICAL REPAIRMAN (Cont'd)

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, carrying, pushing, pulling, handling, fingering, hearing, throwing.

b. Working Conditions: Inside, good ventilation, good light, noisy, mechanical hazards, working alone.

c. Skill Required: This is a skilled job requiring ability to select, install, and line up tools, jigs, and fixtures for various operations, and determine the accuracy of the new parts being produced. The skill must include the ability to operate power tools safely and at the same time produce a good quantity of parts. A blind operator must at all times skillfully apply the four point pattern of safety. He must have the ability to take a worn part as a sample and from it through inspection, measurement, and comparison, determine the pattern, type, and size of piece to be duplicated; and to select, install, and adjust the proper tools accordingly. A blind person must be able to remember or swiftly and accurately make notes in Braille on such items as orders to be filled, material, and supplies to be ordered; and the location of storage bins, racks, tools, parts, and equipment in the shop. He must also be able to accurately read special scales and micrometers.

4. Details of Physical Activities: Stands a major portion of the time at work-bench, performing handwork or operating the power tools. Walks around the shop room distances up to twenty feet to obtain parts, pieces of equipment, or raw materials from the racks and storage bins. Turns, stoops, and reaches to obtain the equipment or parts. Lifts and carries boxes or parts or bars of copper weighing up to fifty pounds. Pushes and pulls operating levers, controls, and clamping devices, with the heaviest pull required amounting to as much as 150 pounds when operating the hand bending equipment. Fingers small pieces and parts such as fusible links used in the reconditioning of cartridge

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ELECTRICAL REPAIRMAN (Cont'd)

type fuses. Handles small and large pieces of bar copper to insert or remove from a machine and to manipulate them against a grinding wheel for the removal of burrs or in the radiusing jig against the side mill for producing rounded corners. Talks and receives orders for materials and parts or must be able to employ the equivalent in alternative methods of communication for the exchange of information with the foreman, superintendent, and other workers at irregular, sometimes infrequent, intervals. Feels to determine the condition of the cutting edge of the tool and to read the engraved or embossed marking on measuring devices, tools, and equipment parts such as mandrels for the bending machine.

5. Details of Working Conditions: Works inside, frequently alone in well ventilated, well lighted, comfortable surroundings. Frequently noisy from machines operating in adjacent rooms in the same building. Mechanical hazards come mainly from the operation of power tools for which there is a safety pattern which when followed closely removes the danger from these hazards. Works alone in the shop room except when foreman, superintendent, and other workers may come in at irregular intervals to obtain materials or to deliver supplies.
6. Hazards: Hazards to this worker come mainly from the operation of the power tools and other equipment on the bench and from materials and supplies stacked on the floor. These hazards can be eliminated almost entirely by (a) the establishment of a well-thought out definite pattern of safety for the power equipment and (b) careful, prompt, well-thought out storage of supplies and parts in regular systematized locations.
7. Sequence of Steps in Position in Plant Surveyed:

In this plant the major items worked on are:

- a. Copper segments for drum type motor speed controllers.
- b. Electro-magnet feed line couplings.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

ELECTRICAL REPAIRMAN (Cont'd)

- c. Hinge pins to be drilled.
- d. Cartridge type fuses to be rebuilt.

The work steps for each are given below:

- a. The making of copper segments
 - (1) With both hands, places bar of copper on the table against miter rail at the left of the saw, shoving the end of the bar against the distance stop at the right of the saw. Continuing to hold the bar in position with the right hand, with the other pulls down lever at the left hand end of the saw bed to clamp stock in position.
 - (2) With the left hand pulls down lever located near the top of the saw frame causing the blade to pass through the bar stock cutting it off to the right length. After the blade has been returned to the starting position, removes cut piece with the right hand.
(NOTE: During the sawing process, keeps the right hand in contact with the distance stop at the right hand edge, thus determining location so as to be sure the right hand does not come under the saw blade and that the piece being cut off stays in position on the table until the saw returns to the starting position.)
 - (3) With the left hand unlocks clamping device, then moves stock up until it touches right hand stop, and clamps it in position for another cut. Continues this until the desired number of pieces of material have been obtained.
 - (4) With a straight piece of stock clamped in position in the Diacro Bending Machine and using the right hand or both hands, if necessary, pulls the lever around from right towards front center, pushing the material against the mandrel. The handle may be returned to the starting position and pulled forward several times to be sure that the stock is snug against the contour of the mandrel.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

ELECTRICAL REPAIRMAN (Cont'd)

- (5) With the left hand pulls forward on the clamping lever to loosen it. With the right hand removes partially bent segment and inserts the other end back in the clamp, tightening with the left hand. Makes several strokes with the bending arm to be sure the second end of the segment is snug against the mandrel. Removes segment from the clamp putting it in tote box at the right, repeating the operation until all of the supply of cut stock has been bent.
- (6) In order to load drill jig, with left hand places new segment in position on the curved track portion of the rotor, and with the right pushes clamping lever up and toward the jig to tighten segment in position ready for drilling. With the right hand pulls down on the drill press lever until the depth stop has been reached. This completes the drilling of the hole and the counter bore to the proper depth. With the right hand lifts the latch allowing the left hand to revolve the rotor of the jig and the segment clockwise until the latch drops into the other notch. This places the segment in position for drilling the second hole. When the drilling is complete, removes segment and places it in a tote box.
- (7) With hand file and/or grinding wheel, deburrs all edges of the new copper segments putting a heavy chamfer on the end edges of the outer surface. (NOTE: A small number of flat segments sawed in a tapered shape are made for flat faced controllers. The wedge shaped segments are obtained by setting the saw at an angle and turning the stock over 180 degrees between each cut. The drill jigs are similar in construction and operation to those used for the curved segment except that the pieces are reversed in the jig to drill the second hole. The corners of the flat segments are rounded by placing them in the jig at the side mill end of the bench grinder. They are set in position over the pins and the top of the jig is rotated through 90 degrees moving the corner past the revolving cutter.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

ELECTRICAL REPAIRMAN (Cont'd)

- b. The slotting of the magnet cable connectors is a fill-in job accomplished on a drill press by the following steps:
- (1) Sets the cup-shaped connector housing in position and clamps it in the jig.
 - (2) Moves the sliding element of the jig forward so that the side of the reamer cuts the entering leg of the "L" shaped slot.
 - (3) When the slide is moved forward as far as possible against the stop, rotates the cup to cut the other leg of the "L".
 - (4) Raises the drill press handle to move the reamer out of the slot and removes the cup from the jig.
- c. Drilling holes in end of hinge pin. This operation is done with a fixed jig and a drill in a drill press, the jig being placed in position and lined up on the table similar to the operation in items a. and b.
- (1) Inserts the hinge pin as far as it will go in a hole in the side of the jig.
 - (2) Pulls down on the drill press handle drilling a hole in the pin. When the drill has been raised, removes the pin from the jig, places it in a box, and repeats operation.
- d. Reloading cartridge type electric fuses. Two types of renewable or refillable electric fuses are sent into the shop for reloading. The first is the round end type; the second for heavier amperage is the blade end type. Altogether fifteen different types or sizes are processed in the reloading project. The steps for each type are given below:
- (1) The round end, sixty ampere size. Steps as follows:
 - (a) By hand, unscrews the metal cap at each end of the cartridge. In some cases this may require the use of pliers. (NOTE: Care must be taken to catch the slotted disk that falls out of one end.)

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

ELECTRICAL REPAIRMAN (Cont'd)

- (b) By hand, removes left-over pieces of the fuse from the slotted end of the tube and from the slotted disk. Dumps out any remaining pieces of fuse or refuse from inside the tube of the cartridge.
- (c) With sandpaper, emery cloth, or file, cleans surfaces of caps on the end of the tube and the flat surface of the slotted disk to insure good electrical contact.
- (d) Inserts new fuse link of the desired size through the slot in the closed end of the cartridge until only approximately 1/4" remains. With the fingers, bends this over at right angles. (NOTE: The amount bent over is not critical but it should not be so great as to allow the corners to extend beyond the edges of the round end whereby they would interfere with screwing the cap into place.) Replaces cap screwing it down firmly on the bent over portion of the fuse link.
- (e) Slips slot in small disk over the remaining end of the fuse link and bends it over with the fingers. (NOTE: Be sure the corners of link material do not extend over the edges of the round part of the disk.) Replaces cap on the remaining end of the cartridge and screws it down firmly by hand.
- (f) With sandpaper cleans the circumferential surfaces of the caps on each end. Inserts cartridge in corresponding clips on the test board and listens for a good, strong buzzer signal to indicate that surfaces and contacts are thoroughly clean. (NOTE: If the buzz is weak or intermittent, removes cartridge and re-cleans surfaces and tests again until good, clear, satisfactory test note on the buzzer is obtained.)
- (g) Removes cartridge from clip and places it in proper container.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

ELECTRICAL REPAIRMAN (Cont'd)

- (2) The re-loading of the knife blade type cartridges (size 100 to 600 amperes.) The work is done in the following steps:
- (a) Removes the blade and interior fusible link support by unscrewing ferrule at one end of the cylindrical cartridge and turning the blade at the other end until it slips through the notches in the cap.
 - (b) With a screw driver, takes out the screw at each end of the fuse link and removes the stubs of the old link.
 - (c) With sandpaper, emery paper, and/or file cleans surfaces of the blade and of the electrical contact surfaces at the points where the fuse links are fastened down.
 - (d) Lays new fusible lengths in place and inserts screws at each end tightening them down with a screw driver.
 - (e) Inserts blade in test clips of the corresponding size and checks for electrical continuity. (NOTE: If buzz is weak or intermittent, re-moves cartridge and re-cleans surfaces and tests again until good, clear, satisfactory note on the buzzer is obtained.)
 - (f) Reassembles cartridge by passing notched blade through the tube of the cartridge and the slot in the closed end. Gives blade assembly a quarter turn until peg on the desk end registers with the corresponding notch in the cartridge. Replaces cap over this end and tightens up firmly by hand or pliers according to the size of the cartridge. Deposits cartridge in proper container for its size.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Bench Type Delta Drill with 1/2" Jacob Chuck, also provided with several different types of jigs for the particular work to be performed. Special double diameter drill to give proper counter bore.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

ELECTRICAL REPAIRMAN (Cont'd)

Delta Metal Cutting Disk Saw with 10" blade. Diacro #2 Hand Bending Machine, capacity up to 5/8" diameter cold rolled steel rod. Equipped with various mandrels to give diameters from 3 1/4" up to 5 1/4" radius inclusive. One-half horse power electric grinder equipped with 6" cup wheel and side milling cutter with radiusing jig. Slot gauge for checking radius of different sample segments. Fuse tester and replacement equipment including bins for various parts. Notched flexible steel rule for measuring length of arcs of copper segments. One inch micrometer with special scale for fingernail reading. Other hand tools such as pliers, files, hammer, hack saw, wrenches, etc.

- b. Set-up and Maintenance: Preparation of the equipment for doing the various jobs:

(1) Making of copper segments

- (a) From sample segment determines the dimensions of stock to be used and secures one or more bars of this dimension from the supply rack.
- (b) With flexible rule equipped with gauge, measures length of arc on the inside of the sample segment and sets gauge to this length locking it into position. Sets gauge stop at right hand side of saw housing so that pieces of material will be cut off at this length.
- (c) By trying the sample segment in a slot gauge, determines the radius required and selects the corresponding mandrel placing it in position on bending machine. Clamps a piece of cut stock in position in bending machine. Adjusts the bending nose snug against the stock and locks it in position by tightening down the three holding bolts. At this point the machine is ready for operation.
- (d) Selects proper drill to match hole in the sample segment, inserting it in the drill chuck and tightening it in position. Selects the proper drill jig and moves it

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

ELECTRICAL REPAIRMAN (Cont'd)

along the drill table until the drill can be brought down into the guide hole bushing. Bolts jig firmly in this position. Places sample segment on the curved portion of the jig, pushes it up against the stop, and tightens it. Loosens clamping arm on front of jig to allow the segment holding portion to be rotated under the drill. With the right hand lowers drill and with the left rotates the segment holding portion until the drill enters the hole in the sample segment. Locks drill spindle to retain the drill in the hole at the desired depth. Sets drill press depth stop to reproduce the desired depth. With Allen wrench loosens right hand latch plate, revolves it until latch blade drops into notch, and locks plate in position by tightening Allen screw. With Allen head wrench loosens left hand latch plate at the back of the jig, lifts the drill out of the first hole, and revolves rotor of jig until drill enters second hole in sample segment where it is locked in place. With the latch in position in the slot, tightens screw on left hand latch plate. This completes the setting of the jig and sample segment is removed.

(2) Electro-magnet feed line couplings

The proper reamer is selected and fixed in the chuck of the drill press. The special jig is placed on the table of the drill press, lined up with respect to the reamer, and clamped in this position. This jig has an element that can be moved laterally and at right angles.

(3) Hinge pins to be drilled

Selects proper size drill and fastens it in the drill press chuck. Selects the proper drill jig, moving it into position on the drill press table so that the drill enters the bushing. Bolts the jig firmly in this position on the table. Sets the travel stops on the drill press so that the drill will pass completely through the pin to be drilled.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

ELECTRICAL REPAIRMAN (Cont'd)

(4) Cartridge type fuses to be rebuilt

Periodically refills the compartments with their respective size fuse links. Replenishes the supply of sandpaper.

- c. Modification: At first notches were added to bending machine mandrels and embosses Braille dots to compartments containing different types and sizes of fuse lengths to facilitate identification by the blind worker. This labeling proved to be of progressively less value as the worker became familiar with the different items used in the job. The use of these special jigs and fixtures proved equally valuable to both sighted and blind workers in terms of quantity and quality of work produced. The new man had no responsibility for sharpening drills or tools since the standard practice for the plant was to have this type of work done in the tool cribs. The blind worker was able to reinstall new saw blades and jigs or fixtures as the job required.

9. Equipment Variations Which May be Found in Other Plants:

The type of equipment and the extent to which special jigs and fixtures are used will vary widely from plant to plant according to the type and quantity of equipment to be maintained. Variation of the items to be made might necessitate the addition of other equipment such as a milling machine, lathe, or specialized machine tools. In some cases the electric repair shop worker may be required to do many of the jobs incident to the cleaning, repair, and rewinding of electric motors.

10. Usual Pre-employment Training: The worker assigned to this job in the plant starts in as an apprentice or helper. He may have had some vocational trade school training and other mechanical work experience.
11. Usual Training Procedure on the Job: In addition to training usually received as an apprentice or a helper

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

ELECTRICAL REPAIRMAN (Cont'd)

working with a journeyman, a new worker being assigned to this type of job may receive instructions from the foreman and/or a set-up man as he takes over one operation after another. When new jobs come into the shop, the worker receives instructions either directly from the foreman or through a set-up man. The training on a new fixture of any type frequently comes from the set-up man who installs the equipment.

12. Any Training Deviations Suggested for the Blind: The blind worker coming on the job should have had special training on both hand and power tools in order that:
(a) It can be accurately and definitely determined ahead of time that he has the aptitude, ability, skill, and personality to make good on the particular job; (b) That his starting skill is equal to or better than that of the average sighted worker taking over the same operation. This will ensure the impression from the start that there will be no deficiencies on account of his blindness. The training should especially point up the use of alternative methods of perception and their application to any machine operation.
13. Production:
 - a. Full: In the plant surveyed no particular production figures had been set for any of the operations in this job. The foreman relies upon his own judgment to determine whether the worker is properly applying himself and producing sufficient quantities of work.
 - b. Time to Reach Normal Efficiency: The worker may be expected to reach full production and self-reliance within two weeks to two months according to conditions and the complexity of the jobs.
14. Interrelation with Preceding and Succeeding Jobs: There is no close relationship with other jobs as a good supply of these items are kept in stock. However, occasionally an order comes in which must be rushed through to

LOOK FOR THIS TYPE OF WORK IN THE COURSE OF EACH PLANT SURVEY

ELECTRICAL REPAIRMAN (Cont'd)

take care of a particular piece of equipment being overhauled and returned to production as rapidly as possible.

15. Teaming with Other Workers: This is seldom necessary except **when supplies are being delivered** in large bundles requiring two workers to handle them.
16. Modification, Deviation, Special Tools for the Blind:
The only special tools required are brailled scales and specially engraved micrometers. It might be desirable to label some parts and bins for supplies in Braille. Arrangements include the bringing of parts, orders, and supplies to the shop and the delivering of finished parts to other supply rooms by sighted workers.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting the Suitability of a Particular Job:
 - (1) For the totally blind no necessity for reading blue-prints, detailed extensive orders, or other instructions. No travel to secure or to dispose of parts and materials outside the immediate shop room.
 - (2) For the partially sighted -- traffic, travel, and lifting requirements compatible with the physical and eye condition of the worker.
18. Avoid the Following Conditions: Avoid a poorly organized shop where other workers may at any time use the tools and equipment without returning them to the proper place or where hand and power tools are in bad condition.
19. Other Jobs Often Combined for Full-time Employment: A worker on this position may in some cases be required to take care of a small tool crib dispensing supplies and equipment.
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found: The making of frequently
LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH JOB-SURVEY

MACHINE OPERATIONS
(Metal Working Power Tools)

ELECTRICAL REPAIRMAN (Cont'd)

used replacement parts and the servicing and overhauling or rebuilding of equipment is to be found in many plants throughout the country. The making of the particular items of controller parts will be found in any heavy industry plant using a considerable number of motors which must be started, stopped, and speed controlled frequently. Such might be boiler works, locomotive factories, ship yards, steel mills, and railroad general repair shops. Large plants in light industries using a considerable number of electric power or pneumatic hand tools may also have a similar job setup, one example being the air-craft industry.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY

FEDERAL SECURITY AGENCY
Office of Vocational Rehabilitation
Washington 25, D. C.

January 5, 1950

REHABILITATION SERVICE SERIES NUMBER 58--SUPPLEMENT 10

To: Divisions of Vocational Rehabilitation (in States with no separate Agency for the Blind); Commissions and Other Agencies for the Blind.

Subject: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category GC-6 - Machine Tending, Feeding, and Off-Bearing.

The attached information on Machine Tending, Feeding, and Off-Bearing is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as the 6th category in Part II, General Coverage Series. It describes a few of the typical jobs frequently found in the category suitable for performance without the use of sight. Like the jobs described in the previous issue, those in this category have been observed and tested by a blind member of the staff of Services for the Blind Branch.

Other categories of job specifications are being prepared and will be forwarded to you at an early date. Additional copies of the Handbook or any of its supplements will be furnished upon request.

We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

D. H. Dabelstein

Donald H. Dabelstein
ASSISTANT DIRECTOR

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

GENERAL COVERAGE SERIES

Category GC-6

MACHINE TENDING, FEEDING, AND OFF-BEARING

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERSGENERAL COVERAGE SERIES

MACHINE TENDING, FEEDING, AND OFF-BEARING

General Information Sheet

D. O. T. Alternate Titles: Machine Operator (any industry); Conveyor feeder (any industry); can feeder; can girl; can loader; case feeder; chute feeder; glass girl; glass handler; jar girl; machine feeder. Capping machine operator (any industry) I; bottle capper; capper; jar capper. Capping machine operator (any industry) II; crimping machine operator (paper goods); closing machine operator; double seamer; double seamer machine operator. Spice-Tin Capper Machine Operator (coffee, tea, and spice). Cap starter (any industry); bottle capper; capper; lid starter. Dumming machine feeder (any industry). Label-drying machine feeder (any industry). Labeler, Machine (any industry) I; labeling machine operator; label machine operator; bottle labeler, machine; box labeler; can labeler; carton labeler, machine; package labeler, machine (any industry). Perforating-Machine Operator (any industry); punch operator. Box-Lining Machine Feeder (any industry). Box-Sealing Machine Feeder (any industry). Wrapping-Machine Operator (any industry) I; Carton Wrapping Machine Operator (any industry). Glassine-Wrapping Operator (coffee, tea, and spice; tobacco). Wax-Wrapping Machine Operator (any industry). Laborer, Container Washing (any industry). Bottle-Washer Feeder (any industry); bottle cleaning machine feeder; case opener; feeder man; washer feeder. Off-Bearer (any industry); belt girl; catcher-piler; machine unloader; piler-catcher; pusher-off; switchman; tail-off man; take-off man. Machine Operator (any industry) usually designated according to machine used, as Turret-Lathe Operator; Vertical-Boring-Mill Operator.

Description of Job Category: This category is concerned with jobs that fall within three classifications: (1) Machine tending will deal with that type of work where an individual is responsible for the operation of one or more automatic or semi-automatic machines. The job may require that he either load or unload

MACHINE TENDING, FEEDING, AND OFF-BEARING

General Information Sheet (Cont'd)

the machine or both. This will include such tasks as placing spools of material on reel holders and threading the material into the machine, loading hoppers, feeding chutes, gathering material from the discharge end of the machine and placing on trucks or conveyors or in tote boxes, cartons, or crates. The worker is frequently required to turn the machine on and off and to make minor adjustments. In many instances, such as in the operation of a turret lathe, the worker places individual pieces in the chuck of the machine and removes them after completing a prescribed cycle of operation. (2) Machine feeding will deal with jobs of feeding single or bulk items to automatic or semi-automatic machines by placing them on conveyor belts or chairs, roller conveyors, or chutes. The worker may remove single items from boxes, cartons, or trucks and place them on a conveyor or into a chute; or he may simply transfer an item from one conveyor to another. Frequently, he is responsible for turning the machine on and off. (3) Off-bearing will cover those jobs where it is the duty of the worker to remove material from the discharge end of a machine and place them on skids or conveyors or into boxes, trays, or cartons. He may be required to push trucks a considerable distance to another area where they will be turned over to another worker.

D. O. T. Definitions for:

- a. Machine Tender (any industry)--A general term applied to workers who operate automatic or semiautomatic machines. Classifications are made according to type of machine operated, as CENTERLESS-GRINDING-MACHINE OPERATOR, AUTOMATIC; CHAMFERING-MACHINE OPERATOR II; SEALING-MACHINE OPERATOR I.
- b. Machine Feeder (any industry).
 1. Conveyor Feeder (any industry) I. A Laborer, Container Capping. Places cans, jars, or bottles on conveyor leading to filling or capping machines: Removes items from cardboard carton and places them singly or several at a time on conveyor. May remove filled containers from one conveyor to another. May inspect condition of containers and discard those which are unsuitable.

MACHINE TENDING, FEEDING, AND OFF-BEARING

General Information Sheet (Cont'd)

2. Conveyor Loader (any industry). A Laborer, Loading and Unloading. Loads material on belt, chain, or roller conveyor, by hand or using such tools as shovel or pitchfork. May unload and transfer material from conveyor to bin, carton, skid, or other conveyor.
- c. Off-Bearer (any industry). A Laborer, Loading and Unloading. Removes articles from conveyors, ovens, sterilizing equipment, or discharge ends of processing machines, and places them in containers on floor, trucks, machines, or other conveyors. May pack articles or truck them to other workers. May be designated according to machine tended or article unloaded, as conveyor unloader; Dipping Machine Off-Bearer; Oven Stripper; Oven Unloader; Waste-Pan Unloader. Various articles handled may require the use of aids, such as gloves, hoists, and hooks.

Characteristics of Usual Worker: Women and girls are employed where small, light-weight articles are to be handled. Men and boys are hired when heavy weights or bulky material is to be handled. Young persons who are satisfied with low or medium wages are preferred where sustained rapid movement is required.

Physical Requirements, Aptitudes, and Abilities: The physical demands vary widely, depending upon the nature of the work. Machine tending and off-bearing generally require the worker to stand all day and work rapidly with his hands and arms. Machine feeding operations are frequently so set up that the worker may sit most of the time. However, where heavy materials are to be handled, the worker is generally required to stand. Since the machines are automatic or semiautomatic, the worker must adjust himself to the rhythm of the machine, usually requiring rapid dexterous movements over a prolonged period. Usually a blind person will need to be able to orient himself quickly and accurately within the work area which will vary from a few to several square feet.

MACHINE TENDING, FEEDING, AND OFF-BEARING

General Information Sheet (Cont'd)

Many machines make a distinctive sound which enables a blind person to follow the cycle of his operation accurately.

Training and Preparation Procedures: If the worker is able to withstand the demands of a working day and possesses the physical and manual ability to perform the job, no pre-employment training is necessary. The most complex job in this category can frequently be learned within a few days, and proficiency comes with practice. This is true for sighted as well as blind workers.

Safety Precautions, Health Conditions, Hazards: Since the variation of the types of job in this category is so extensive, it is difficult to refer to any specific type of safety precautions. The employment counselor, therefore, should establish a definite pattern of safety for the performance of each job before placing an individual and should make certain that his client learns and follows the procedure. Especial attention should be paid to minute details in developing this pattern when conveyor belts or chains are involved in the operation.

The work is usually carried on in well-ventilated areas. Where dusty and dirty items are handled, the workers are required to wear respirators and thus protect the nose and throat passages. Protective gloves are worn when the material handled is hot, caustic, rough, or slippery. The wearing of proper clothing will assist in protecting one's health when the work is out of doors.

Industries Where This Category is Frequently Found: Jobs in this

category can be found in almost any industry manufacturing small or medium-size articles on a production basis. Cans, jars, bottles, or other containers are frequently placed on conveyor belts which carry them through a series of machines which seal, close, label, and often carton them. Food products are placed onto belt conveyors or between partitions or lugs of a conveyor belt which carries them into wrapping and packaging machines.

MACHINE TENDING, FEEDING, AND OFF-BEARING

General Information Sheet (Cont'd)

Wood and plastic materials are often fed to a machine which performs a series of processing operations and discharges the completed item at the other end. Powdered or granulated material is often dumped or shoveled into hoppers or poured into chutes which lead to machinery which performs wrapping and packaging or processing operations.

Most automatic machinery requires a person to remove material from the discharge end; and unless visual inspection is necessary, this type of job is frequently found suitable for performance without the use of sight. Where it is necessary for a worker to tend a group of automatic machines, sight is usually required. However, semiautomatic machines generally make certain distinctive noises which will serve to notify a blind person that they have completed their operations or need adjustment.

Jobs Usually to be Avoided Although Seemingly Suitable: Machine feeding, tending, or off-bearing requiring visual inspection or grading of material; set-up, adjustment, or maintenance of equipment; the determination of color of material; and complicated travel over ramps or under moving conveyors. No attempt should be made to place a blind person on a machine with inadequate or inferior guards.

Combination Jobs: These types of jobs may logically be combined with any or all of the following: Carton Set-up, GC-1; Wrapping and Packaging, GC-2; Material Handling, GC-3; Machine Operation, Wood Working Power Tools, GC-4; Machine Operation, Metal Working Power Tools, GC-5; Assembly of Small Parts, GC-8, and Bench Work, Metal, GC-10.

MACHINE TENDING, FEEDING, AND OFF-BEARING

BAG DUMPER

1. Name Used for Position in Plant Surveyed: Bag dumper

D. O. T. Title: Dumper (any industry)

Code: 9-88.01

Alternate Titles: None

D. O. T. Definition: A general term applied to a worker who removes materials or finished products from containers or molds in which they are stored or made. Overturns molds or pots to remove product, dumps loose material from sacks or other containers, tilts large pots or cans, or drains liquid from barrels. Classifications are made according to material or product dumped, as TOMATO DUMPER, container handled, as PAN DUMPER; POT DUMPER, or type of activity, as BLENDER (bakery products); DEFROSTER HELPER.

Items Worked on in Plant Surveyed: Starch

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Medium to heavy weight, husky, agile steady, average mental ability. In some areas colored workers are employed extensively on this job.

3. Physical Demands:

a. Activities: Walking, standing, turning, stooping, reaching, lifting, carrying, pushing, pulling, handling, fingering, feeling, talking, hearing.

b. Working Conditions: Inside, adequate lighting and ventilation, works around others.

c. Skill Required: Ability to coordinate the movements of the hands and arms and to orient within space.

MACHINE TENDING, FEEDING, AND OFF-BEARING

BAG DUMPER (Cont'd)

4. Details of Physical Activities: Walks from 5 to 50 feet to secure material; stands all day and works steadily with hands and arms; turns and reaches to lift and carry material weighing up to 100 pounds a distance of from 5 to 10 feet; pushes and pulls trucks carrying 1,000 pounds of material; handles, fingers, and feels filled and empty sacks; talks with and listens to others to exchange necessary information.
5. Details of Working Conditions: Works around others, inside, in adequately lighted and ventilated area.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Travels a short distance to storage area and loads 100-pound bags onto a hand truck (Type of material is determined by its location in the storage room).
- b. Pushes loaded truck to edge of hopper which is approximately six feet in diameter and whose edge is about two feet above the floor.
- c. Removes one bag from truck and sets it on the floor next to the edge of the hopper.
- d. Cuts open the stitching with a small pocket knife.
- e. Dumps contents of bag into hopper (Sometimes this is accomplished by dumping the upper half of the contents of the bag into the hopper without raising the bag from the floor).
- f. Places empty bag on near-by skid which he removes when filled.
- g. Continues this process until the handtruck is empty, at which time he returns to the storage area to reload the truck and repeat the operation.

MACHINE TENDING, FEEDING, AND OFF-BEARING

BAG DUMPER (Cont'd)8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Hand truck, skids, hopper.
- b. Set-up and Maintenance: None
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants.

10. Usual Pre-employment Training: None11. Usual Training Procedure on the Job: Supervisor instructs new worker in all steps of the operation.12. Any Training Deviations Suggested for the Blind: None13. Production:

- a. Full: About 40 bags per hour.
- b. Time to Reach Normal Efficiency: One week.

14. Interrelation with Preceding and Succeeding Jobs: This worker must keep a sufficient amount of material in the hopper to supply the filling machines on the floor below. Otherwise the production of the plant will be reduced.15. Teaming with Other Workers: Occasionally where higher production is required, two men will work as a team--One supplying filled bags and the other dumping them into the hopper.16. Modification, Deviation, Special Tools for the Blind: None17. Sight Requirements and Conditions:

- a. Vision Required for the Job: Object and color perception

MACHINE TENDING, FEEDING, AND OFF-BEARING

BAG DUMPER (Cont'd)

- b. Conditions Affecting the Suitability of a Particular Job:
1. For the Totally Blind: None
 2. For the Partially Sighted: Travel and reading requirements necessary for determining the color of bags or labels, and the degree of lifting should be compatible with the type and amount of the client's vision.
18. Avoid the Following Conditions: Transfer to other jobs which the worker's limited vision or lack of skill will not permit him to perform.
19. Other Jobs Often Combined for Full-Time Employment: None
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

Any industry where the raw material is of a powdered or granular nature and is received in bags, such as bakeries; paint factories; packagers of such items as sugar, starch, or flour; plastic plants; and manufacturers of drug products.

MACHINE TENDING, FEEDING, AND OFF-BEARING

CAKE-WRAPPING-MACHINE FEEDER

1. Name Used for Position in Plant Surveyed: Cake Wrapping Machine Feeder

D. O. T. Title: Bread-Wrapping-Machine Feeder

Code: 8-02.10

Alternate Title: Feedboard helper; wrapping-and-sealing-machine loader; wrapping-machine feeder; wrapping-room helper.

D. O. T. Definition: Bread Wrapping Machine Feeder (Bakery products) A Laborer. Places loaves of bread on feed-in conveyor of slicing machine or wrapping machine: Removes loaves from racks or from conveyor and places them in correct position, usually between guides, on conveyor leading to slicing or wrapping mechanism. May carry baskets or boxes to machine for workers who remove wrapped bread. May help in cleaning machines, using cloths and brushes.

Items Worked on in Plant Surveyed: Small cakes known as "Honey Dip" (slightly larger than the average cupcake).

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Any size; young person preferred; nimble; alert; average mental ability.

3. Physical Demands:

a. Activities: Standing, turning, reaching, handling, feeling, fingering, talking, hearing, working speed.

b. Working Conditions: Inside, adequate lighting and ventilation, works around others.

c. Skill Required: Ability to differentiate quickly between smooth and rough surfaces, to locate items quickly and accurately within arm's reach, to manipulate the fingers

MACHINE TENDING, FEEDING, AND OFF-BEARING

CAKE-WRAPPING-MACHINE FEEDER (Cont'd)

quickly in the handling and placing of small items so as to keep them in alignment on a moving surface, and to judge speed and distance.

4. Details of Physical Activities: Stands all day; works rapidly with hands and arms; turns continually and reaches up to two feet to secure and dispose of material weighing up to one pound; handles, fingers, and feels material to place it right side up on a moving conveyor belt; talks with, and listens to, others to exchange necessary information.
5. Details of Working Conditions: Works around others, inside, in adequately lighted and ventilated area.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Takes two cakes from a supply bin which has been placed at his right by another worker.
- b. Places them (frosting side up if possible) on the conveyor belt in the empty compartment nearest the wrapping machine that can be reached from the working position.
- c. With the left hand, centers the cakes in the compartment and, if necessary, sets them right side up while he
- d. Takes two more cakes from the supply bin with his right hand and places them in the next vacant compartment.
- e. Continues this sequence.

NOTE: In this type of operation a blind person places material on the conveyor belt with one hand and keeps track of its location and position with the other. After a short breaking-in period, he should adjust his movements to the rhythm of the machine.

MACHINE TENDING, FEEDING, AND OFF-BEARING

CAKE-WRAPPING-MACHINE FEEDER (Cont'd)8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Wrapping machine with compartment-type conveyor belt; movable supply bin.
- b. Set-up and Maintenance: None
- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Substantially the same in all plants except that the height of the walls of the compartments may vary.

10. Usual Pre-employment Training: None11. Usual Training Procedure on the Job: Supervisor instructs new worker in all steps of the operation.12. Any Training Deviations Suggested for the Blind: A blind person should be taught to use one hand as a guide so that he will know that he is placing material properly on the conveyor and so that he will know where to place additional material.13. Production:

- a. Full: 1,500 to 2,000 cakes per hour
- b. Time to Reach Normal Efficiency: One week

14. Interrelation with Preceding and Succeeding Jobs: Full efficiency is maintained when the worker keeps all the compartments filled as they pass the working position. When compartments are left empty, the production of the entire plant decreases.15. Teaming with Other Workers: None16. Modification, Deviation, Special Tools for the Blind: None

MACHINE TENDING, FEEDING, AND OFF-BEARING

CAKE-WRAPPING-MACHINE FEEDER (Cont'd)17. Sight Requirements and Conditions:a. Vision Required for the Job: Noneb. Conditions Affecting Suitability of a Particular Job:

1. For the Totally Blind: No travel to secure material; no requirement for setting up the machine or observing the operation of the wrapping mechanism.
2. For the Partially Sighted: Requirement for travel to secure material and to observe the operation of the machine should be compatible with the type and amount of worker's vision.

18. Avoid the Following Conditions: Transfer to other jobs which cannot be performed without the use of sight.19. Other Jobs Often Combined for Full-Time Employment: Hand wrapping; feeding flat belt conveyor; and off-bearing from wrapping and packaging machines.20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Factories engaged in: Production of baked goods; canning and preserving; manufacturing confectionery items; production of miscellaneous food products; manufacturing electrical equipment; the production of drugs; and manufacturing cosmetics.

MACHINE TENDING, FEEDING, AND OFF-BEARING

RIPSAW OPERATOR

1. Name Used for Position in Plant Surveyed: Ripsaw Off-Bearer

D. O. T. Title: Off-Bearer (any industry)

Code: 9-88.01

Alternate Titles: Belt girl; catcher-piler; machine unloader; piler-catcher; pusher-off; switchman; tail-off man; take-off man.

D. O. T. Definition: A Laborer, Loading and Unloading. Removes articles from conveyors, ovens, sterilizing equipment, or discharge ends of processing machines, and places them in containers on floor, trucks, machines, or other conveyors. May pack articles or truck them to other workers. May be designated according to machine tended or article unloaded, as CONVEYOR UNLOADER; DIPPING-MACHINE OFF-BEARER; OVEN STRIPPER; OVEN UNLOADER; WASTE-PAN UNLOADER. Various articles handled may require the use of aids, such as gloves, hoists, and hooks.

Items Worked on in Plant Surveyed: Boards for caskets.

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Average size, active, steady, average mental ability.

3. Physical Demands:

a. Activities: Standing, reaching, pushing, pulling, turning, handling, working speed.

b. Working Conditions: Inside, dirty, noisy, adequate lighting and ventilation, working around others.

c. Skill Required: Unskilled; good orientation and ability to locate position and work quickly and accurately, and to judge speed of material traveling through the saw.

MACHINE TENDING, FEEDING, AND OFF-BEARING

RIPSAW OPERATOR (Cont'd)

4. Details of Physical Activities: Stands all day, works rapidly with hands and arms, reaches to secure boards from 1/2" to 1" thick 2" to 8" wide and 2' to 6' long, continually turns to place ripped boards weighing up to 15 pounds on skid, pushes and pulls boards to arrange them on skids.
5. Details of Working Conditions: Works around others in an adequately lighted and ventilated room under strain of excessive noise (high pitch or squeal characteristic of saw and planer) from the operation of power equipment, and dirty because of dust thrown from other machines.
6. Hazards: There are no particular hazards; however, the worker should adhere to general safety practices and wear no gloves or tie.
7. Sequence of Steps in Position in Plant Surveyed:

Worker stands at side of roller conveyor at discharge end of the saw and listens for the sound of the saw as it engages the wood to tell when boards are coming to him.

- a. Removes board from far side of conveyor.
- b. Turns and places board on skid behind him, making sure that the boards are stacked evenly and are centered on the skid.
- c. Returns to conveyor and removes scrap material which is stacked on another skid adjacent to the first or if board is wide enough to permit a second cut.
- d. Returns it to the operator by passing it over the top of saw guard.

NOTE: Care should be taken to swing the board in such a manner that it does not strike other workers or material.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Ripsaw, roller conveyor, and skids.

MACHINE TENDING, FEEDING, AND OFF-BEARING

RIPSAW OPERATOR (Cont'd)

- b. Set-up and Maintenance: None
- c. Modification: None
- 9. Equipment Variations Which May be Found in Other Plants:
Substantially the same in all plants.
- 10. Usual Pre-employment Training: None
- 11. Usual Training Procedure on the Job: Supervisor instructs new worker in all steps of the operation.
- 12. Any Training Deviations Suggested for the Blind: None
- 13. Production:
 - a. Full: Not established because of the wide variety of lengths and widths of material processed.
 - b. Time to Reach Normal Efficiency: Three to four weeks
- 14. Interrelation with Preceding and Succeeding Jobs: Failure to remove boards as quickly as they are cut results in slowing down the entire operation.
- 15. Teaming with Other Workers: None
- 16. Modification, Deviation, Special Tools for the Blind: None
- 17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions Affecting the Suitability of a Particular Job:
 - 1. For the Totally Blind: No requirement to inspect lumber for knots or grain and no travel outside the work area to dispose of material.
 - 2. For the Partially Sighted: Requirements for lifting, inspection, and travel should be compatible with the type and amount of worker's vision.

MACHINE TENDING, FEEDING, AND OFF-BEARING

RIPSAW OPERATOR (Cont'd)

18. Avoid the Following Conditions: Transfer to other jobs which cannot be performed without the use of sight.
19. Other Jobs Often Combined for Full-Time Employment: Off-bearing from the planing or grooving machines.
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found:

Furniture, toy, wood specialty, novelty, fishing tackle, house pre-fabrication, sash and door and box factories, cabinet shops, and industries where by-products are manufactured from salvaged materials, or any industry where wood is used in crating, cribbing, and bridging for the shipment of its products.

FEDERAL SECURITY AGENCY
Office of Vocational Rehabilitation
Washington 25, D. C.

June 30, 1949

REHABILITATION SERVICE SERIES NUMBER 58 - SUPPLEMENT 6

To : Divisions of Vocational Rehabilitation (in States with no separate Agency for the Blind); Commissions and other Agencies for the Blind.

Subject: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Category GC-11, Photographic Processing.

The attached material on Photographic Processing is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as the fourth category in Part II, General Coverage Series. It describes a few of the darkroom processing operations and is not intended to be all inclusive of all possibilities for blind workers. Like the jobs described in previous issues, those in this category have been observed and tested by a blind member of the staff of Services for the Blind.

Other categories of job specifications are being prepared and will be forwarded to you at an early date. Additional copies of the Handbook or any of its supplements will be furnished upon request. We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

D. H. Dabelstein

Donald H. Dabelstein,
ASSISTANT DIRECTOR

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HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

GENERAL COVERAGE SERIES

Category GC-11

PHOTOGRAPHIC PROCESSING

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The above list only partially represents the employment opportunities for blind persons in this category and specifications for others will be issued as circumstances permit. Additional jobs such as the following should be sought and all jobs must be carefully analyzed for suitability under the conditions found in a particular plant:

Darkroom Technician (Manual Darkroom - Roll Film)

Film Printer

Negative Loader

Print Drying Belt Feeder

HANDBOOK OF
REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

GENERAL COVERAGE SERIES

PHOTOGRAPHIC PROCESSING

General Information Sheet

D. O. T. Alternate Titles: Film Developer (Motion pictures); Film printer (Motion pictures); reproduction machine leader (Motion pictures); photostat operator (any industry); darkroom man (darkroom technician) (any industry); developer I (any industry).

Description of Job Category: Photographic processing work is primarily conducted in "darkrooms" which are almost totally without illumination when the work is being performed. The category is chiefly concerned with those jobs which entail the handling and manipulating of rolled or cut film in either a dry or wet condition. The work may require the mixing of chemicals as well as the checking and regulating of liquid temperatures. Although machine feeding is included in certain job specifications, the work is performed essentially by hand.

D. O. T. Definition for

- a. Darkroom Man or Darkroom Technician (any industry). Develops photographic negatives; makes prints from negatives; makes enlarged prints from small negatives; works in a completely dark room, which may be lighted by dim, colored lights.
- b. Developer I - (any industry). A Darkroom Man who treats exposed film with chemical solutions in a darkroom to bring out the latent image; mixes chemicals with water usually following rigid formulas and closely regulating temperature of solutions; immerses films, for specified periods of time, in developer solution to make the image visible, in an acidified stop-bath of water and acetic acid to remove developer solution, and in hypo to fix the print.

Characteristics of Usual Worker: Men or women are employed in this type of work; preference is given to young persons who are mentally alert, of an even temperament, and reliable.

PHOTOGRAPHIC PROCESSING

General Information Sheet (Cont'd)

Physical Requirements, Aptitudes, and Abilities: A considerable amount of movement may be required; therefore, the worker should be able to maintain an accurate sense of direction at all times. Better than average manipulative ability is essential. The worker must be able to stand all day and work rapidly with hands and arms; he must remember the location and stage of development of each film at all times and is generally required to move continually about the work area.

Training and Preparation Procedures: Induction into this work is usually through on-the-job training. Inexperienced applicants may be hired as trainees or helpers and assigned to a darkroom man until they learn how to perform the work efficiently. The time involved in producing competent workers by this means varies according to the ability of the trainee and the adequacy of the training given. The average time involved, however, is approximately six months. Completion of courses offered in vocational and trade schools may shorten the training time for this job. This type of training is particularly advisable for blind persons.

Safety Precautions, Health Conditions, Hazards: Worker is subject to cracking, staining, irritation and possible poisoning of the skin from continual wetting of the hands with the chemical solutions used in developing. This hazard can be substantially reduced by frequent rinsing of the hands in running water.

Industries Where This Category is Frequently Found: The motion picture industry; newspaper and publishing industry; advertising industries; photo developing and finishing establishments in the field of science, engineering, law, education and trades for establishing recorded data, and for making observations and securing more or less quantitative data than would be possible from the use of the naked eye. X-ray darkroom work may be found in hospitals, medical schools and universities, public health organizations, medical departments of industrial establishments, x-ray laboratories serving a group of physicians, dentists or chiropractors in industrial establishments such as foundries, industrial science laboratories, aircraft manufacturers and other concerns where parts are analyzed for the purpose of detecting internal flaws and other internal details.

Jobs Usually to be Avoided although Seemingly Suitable: Contact printing, film splicing, enlarging, cutting and edging.

Combination Jobs: None

PHOTOGRAPHIC PROCESSING

DARKROOM TECHNICIAN - X-RAY FILM
(MANUAL DARKROOM)1. Name Used for Position in Plant Surveyed: Darkroom TechnicianD. O. T. Title: Darkroom man; ref., developer (any industry)Code: 5-86.510Alternate Title: Darkroom Technician

D. O. T. Definition: Developer (1) (any industry). A Dark-room man who treats exposed film with chemical solutions in a darkroom to bring out the latent image; mixes chemicals with water usually following rigid formulas and closely regulating temperature of solutions; immerses films for specific periods of time, in developer solution to make the image visible, in an acidified spot-bath of water and acetic acid to remove developer solution, and in hypo to fix the print.

Items Worked on in Plant Surveyed: X-ray film2. Usual Operator:a. Sex: Male or female

b. General Characteristics: Any size except that extremely short persons might be at a disadvantage because of the requirement of reaching for hangers which are suspended from brackets above the work table; even temperament; young persons preferred; methodical; good judgment; average mental ability.

3. Physical Demands:

a. Activities: Walking, standing, turning, reaching, lifting, carrying, handling, fingering, feeling, hearing.

b. Working Conditions: Inside, wet, odors; adequate ventilation; works alone.

c. Skill Required: Semi-skilled; ability to handle thin flexible sheets of material quickly and to position them accurately; remember the location of a number of items and locate any of them quickly; mentally record the various stages of progress when processing a number of different items at the same time; maintain an accurate sense of direction and distance; coordinate the movement of hands and arms; recognize texture, size and contour by touch.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

DARKROOM TECHNICIAN - X-RAY FILM (Cont'd)
(MANUAL DARKROOM)

4. Details of Physical Activities: Stands all day; frequently walks up to 15 feet to secure and dispose of materials; reaches at shoulder height up to 4 feet to lift items weighing up to 10 lbs. and places them on work bench in front of him or into developing tanks; fingers, feels, handles, pushes and pulls items weighing up to 2 lbs. to load and unload cassettes and hangers; turns and carries items weighing from a few ounces to 5 lbs. a distance of from 5 to 15 feet; listens for sounds to inform him that pass box is to be unloaded or that film should be transferred to another tank.
5. Details of Working Conditions: Works alone, inside, in adequately ventilated almost totally dark room, wet because of the necessity of transferring film from one chemical solution to another; odors caused by the evaporation of chemical solutions.

6. Hazards: None

7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Removes cassette from incoming side of pass box; places it on work table in front of him and closes the pass box.
- b. Removes identification card from cassette and places it, printing down, in film identifier.
- c. Unlocks cassette by turning lock bar a quarter turn counterclockwise.
- d. Opens lid of cassette slightly; removes film by grasping it between thumb and first finger, and closes lid.
- e. Places predetermined portion of film in film identifier and "flashes" the film.
- f. Selects proper size hammer from bracket above the work table and fastens one of its clips to each corner of the film, making certain that the film is not buckled.
- g. Places the loaded hanger in developing solution and sets time clock.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

DARKROOM TECHNICIAN - X-RAY FILM (Cont'd)
(MANUAL DARKROOM)

- h. Selects proper sized film from storage bin; removes paper covering; opens lid of empty cassette; places the film in cassette, closes it gently, and locks the lid.
- i. Removes card from film identifier and places it along with the loaded cassette in the outgoing side of the pass box.
- j. When time clock rings, removes film from developing tank; washes in stop tank and places in fixing tank.
- k. At the completion of "fixing" time, transfers film to washing tank.
- l. At completion of "washing" time, removes film from washing tank and places it in drier.
- m. When film is dry, removes from drier.
- n. Removes film from hanger and places it at one end of the work table for removal by x-ray technician.
- o. Returns hanger to proper position above work table.

NOTE: Several films may come to the darkroom technician at one time, making it necessary for him to keep the developing tank loaded to capacity, in which case care must be taken that the films do not come in contact with each other while they are in the developing and fixing baths.

In order to avoid crimping or crinkling, dry film should be handled by suspending it between the thumb and forefinger, with the hand uppermost. In handling film, grasp it as near to the edge as possible.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Work table, cassettes, hangers, liquid thermometer with Brailled dial; Chamberlain Film Identifier; developing and fixing tanks; open-faced time clock; Eastman Film Drier.
- b. Set-up and Maintenance: Worker must take temperatures and adjust mixing valves in order to maintain proper temperatures in the developing tanks; he may also be required to mix his own developing and fixing solutions, clean the tanks and keep darkroom in order.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

DARKROOM TECHNICIAN - X-RAY FILM (Cont'd)
(MANUAL DARKROOM)

- c. Modification: An open-faced clock should be used in order that a blind person may set his own clock; small strips of adhesive tape can be placed at each half minute marking. The American Foundation for the Blind supplies a Braille thermometer which can be read accurately by touch.
9. Equipment Variations Which May be Found in Other Plants:
- Substantially the same in all darkrooms. If a film identifier is not used, the identification markings are usually photographed at the same time the original x-ray picture is taken.
10. Usual Pre-employment Training: Two to four weeks training in darkroom work is usually given to persons employed in this field.
11. Usual Training Procedure on the Job: The chief x-ray technician closely supervises the work of a new employee and gradually tapers off supervision as the worker's knowledge and skill increase.
12. Any Training Deviations Suggested for the Blind: A blind person should know the on and off position of each switch controlling the lights in the darkroom in which he is working and be solely responsible for operating them. Prior to placement he should have a thorough knowledge of all phases of darkroom procedure. One source of training is the Mallinckrodt Institute of Radiology, St. Louis, Missouri, where arrangements for four weeks' training at a cost of \$50, exclusive of transportation and maintenance can be made with Mr. Wilbur Maich, Chief x-ray technician.
13. Production:
- a. Full: 150 to 200 films per day
- b. Time to Reach Normal Efficiency: If previously trained, two to four weeks.
14. Interrelation with Preceding and Succeeding Jobs: Cassettes must be removed from the incoming side of the pass box, emptied, reloaded, and placed in the outgoing side of the pass box as quickly as possible in order that the x-ray technician may have a complete supply at all times.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

DARKROOM TECHNICIAN - X-RAY FILM (Cont'd)
(MANUAL DARKROOM)

15. Teaming with Other Workers: Occasionally two darkroom technicians will work together, one being responsible for unloading cassettes, hanging films, and reloading cassettes, and the other responsible for processing the films through the fixing, developing and washing tanks.
16. Modification, Deviation, Special Tools for the Blind: A blind worker should have a Brailled liquid thermometer, in order that he may regulate the temperature in the developing and fixing tanks. An open-faced time clock can easily be read by a blind person if small strips of adhesive tape or other raised identifications are placed at the half-minute markings.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: There should be no requirement for reading instruction cards or writing information on the film.
 2. For the Partially Sighted: Because of the fact that "safe" light is the only illumination in a darkroom, there should be no requirement for reading instructions or writing information on the film.
18. Avoid the Following Conditions: Necessity to write case numbers and identifying information on film; the use of a closed-face time clock.
19. Other Jobs Often Combined for Full Time Employment: None
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

X-ray departments of general hospitals with 250 beds or more and with an out-patient department; veterans' hospitals with 300 beds or more; large tuberculosis sanatoria; radiology departments of medical schools; x-ray centers serving a group of chiropractors; x-ray centers serving a group of surgeons and medical doctors; industrial plants; arsenals and large engineering projects where castings, molding, foundations or any solid objects are subject to x-ray tests.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

PHOTOGRAPHIC PROCESSING

PACO MACHINE OPERATOR - X-RAY FILM

1. Name Used for Position in Plant Surveyed: Paco Darkroom Technician.

D. O. T. Title: Paco Machine Operator (any industry)

Code: 9-36.38

Alternate Titles: None

D. O. T. Definition: Not compiled

Items Worked on in Plant Surveyed: X-ray film
2. Usual Operator:
 - a. Sex: Male or female
 - b. General Characteristics: Any size; even temperament; young persons preferred; methodical; average mental ability.
3. Physical Demands:
 - a. Activities: Walking, standing, turning, reaching, lifting, carrying, pushing, pulling, handling, feeling, hearing.
 - b. Working Conditions: Inside; odors; adequate ventilation; works alone.
 - c. Skill Required: Semi-skilled; ability to handle thin flexible sheets of material quickly and to position them accurately; remember the location of a number of items and locate them quickly; maintain an accurate sense of direction and distance; coordinate the movement of hands and arms; recognize size and contour by touch.
4. Details of Physical Activities: Stands all day; frequently walks up to 15 feet to secure and dispose of materials; reaches at shoulder height up to 4 feet to lift items weighing up to 10 pounds, and places them on work bench in front of him, or into magazine of Paco machine. Pushes levers to secure films to hangettes to load the magazine of the Paco machine; turns and carries items weighing from a few ounces to 5 pounds a distance of from 5 to 15 feet; fingers, feels, handles, pushes and pulls items weighing up to 2 pounds to load and unload cassettes and hangettes; listens for sounds to inform him that pass box is to be unloaded.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

PHOTOGRAPHIC PROCESSING

PACO MACHINE OPERATOR - X-RAY FILM (Cont'd)

5. Details of Working Conditions: Works alone, inside, in adequately ventilated, almost totally dark room; odors caused by the evaporation of chemical solutions.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Removes cassette from incoming side of pass box, places it on table in front of him and closes the pass box.
- b. Removes identification card from cassette and places it, printing down, in film identifier.
- c. Unlocks cassette by turning lock bar a quarter turn counterclockwise.
- d. Opens lid of cassette slightly, removes film by grasping it between the thumb and first finger, and closes lid.
- e. Places predetermined portion of film in film identifier and "flashes" the film.
- f. Selects proper size hangette from bracket beneath the work table and places it in the loading machine, making sure that each of the 4 pin holders fit into the proper notches in the frame of the loading machine.
- g. Removes film from identifier and places it between the film guides of the loading machine.
- h. Attaches film to hangette by pressing handle of film loading machine as far down as it will go.
- i. Removes loaded hangettes from loading machine and after taking the identifying card from the film identifier places it in the clip on top of the hangette.
- j. Stacks loaded hangettes on work bench against the wall until several have accumulated.
- k. Selects proper size film from storage bin, removes paper covering, opens lid of empty cassette, places the film in cassette, closes it gently and locks the lid.
- l. Places loaded cassette in the outgoing side of the pass box.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

PHOTOGRAPHIC PROCESSING

PACO MACHINE OPERATOR - X-RAY FILM (Cont'd)

- m. Picks up several hangettes and suspends them from the loading bars of the Paco machine.
- n. Pulls lever to advance hangettes to the magazine of the Paco machine, from which point they are processed automatically and delivered dry to the x-ray technician outside the darkroom.

NOTE: In order to avoid crimping or crinkling, dry film should be handled by suspending it between the thumb and forefinger, with the hand uppermost. In handling the film, grasp it as near to the edge as possible.

Several cassettes may come to the darkroom technician at one time, in which case he usually completes the handling of the film before reloading the cassette.

8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Work table, cassettes, hangettes, Chamberlain film identifier, Paco developing machine.
- b. Set-up and Maintenance: The worker is expected to set the controls of the Paco machine. They consist of:
 - 2 electric switches - one controlling the drying mechanism, the other controlling the mechanism which moves the film from tank to tank;
 - 2 timing control levers - one for half minutes and another for full minutes. These levers are so constructed that their points fit into holes at each marked graduation, making it possible for a blind person to set them without assistance.

The worker may also be required to mix his developing and mixing solutions. This can be done by a blind person if he uses ready mixed packages of developing and fixing chemicals.

- c. Modification: None

9. Equipment Variations Which May be Found in Other Plants:

Essentially the same in all darkrooms. If a film identifier is not used the identification markings are usually photographed at the same time the original picture is taken.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

PHOTOGRAPHIC PROCESSING
PACO MACHINE OPERATOR - X-RAY FILM (Cont'd)

10. Usual Pre-employment Training: Induction into this work is usually through on-the-job training.
11. Usual Training Procedure on the Job: The chief x-ray technician closely supervises the work of a new employee and gradually tapers off supervision as the worker's knowledge and skill increase.
12. Any Training Deviations Suggested for the Blind: A blind person should know the on and off positions of each switch controlling the lights in the darkroom in which he is working and be solely responsible for operating them. Prior to placement he should have a thorough working knowledge of all phases of darkroom procedure. One source of training is the Mallinckrodt Institute of Radiology, St. Louis, Missouri, where arrangements for four weeks' training at a cost of \$50, exclusive of transportation and maintenance can be made with Mr. Wilbur Walch, Chief x-ray technician.
13. Production:
 - a. Full: 300 to 400 films per day.
 - b. Time to Reach Normal Efficiency: Two weeks, if trained for this type of work.
14. Interrelation with Preceding and Succeeding Jobs: Cassette must be removed from the incoming side of the pass box, emptied, reloaded and placed in the outgoing side of the pass box as quickly as possible in order that the x-ray technician may have a complete supply at all times.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None
 - b. Conditions affecting Suitability of a Particular Job:
 1. For the Totally Blind: None
 2. For the Partially Sighted: None
18. Avoid the Following Conditions: Necessity to write case numbers and identifying information on film.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

PHOTOGRAPHIC PROCESSING

PACO MACHINE OPERATOR - X-RAY FILM (Cont'd)

19. Other Jobs Often Combined for Full Time Employment: None
20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

X-ray department of general hospitals with 250 beds or more and with an out-patient department; veterans' hospitals with 300 beds or more; large tuberculosis sanatoria; radiology departments of medical schools; x-ray centers serving a group of chiropractors; x-ray centers serving a group of surgeons and medical doctors; industrial plants; arsenals and large engineering projects where castings, molding, foundations or any solid objects are subject to x-ray tests.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

PHOTOGRAPHIC PROCESSING

PACO MACHINE OPERATOR - ROLL FILM

1. Name Used for Position in Plant Surveyed: Paco Machine Operator

D. O. T. Title: Paco Machine Operator (any industry)

Code: 9-36.33

Alternate Titles: None

D. O. T. Definition: Not compiled

Items Worked on in Plant Surveyed: Roll Film

2. Usual Operator:

a. Sex: Male

b. General Characteristics: Any size, even temperament, steady, young persons preferred, methodical, average mental ability.

3. Physical Demands:

a. Activities: Walking, standing, turning, reaching, lifting, carrying, pushing, pulling, handling, fingering, hearing.

b. Working Conditions: Inside, odors, adequate ventilation, works alone.

c. Skill Required: Semi-skilled; ability to handle thin flexible strips of material quickly and to position them accurately; remember the location of a number of items and locate them quickly; maintain an accurate sense of direction and distance; coordinate the movement of hands and arms.

4. Details of Physical Activities: stands all day; frequently walks a distance varying from 2 ft. to 15 ft. to secure material; continually turns, reaches and lifts items weighing approximately 3 lbs. from waist to shoulder height; occasionally carries boxes of material weighing up to 15 lbs. a distance varying from 5 ft. to 15 ft; handles, pushes, pulls, fingers and feels strips of film, clips and film hangers to place the film in the proper position for developing. From time to time listens to and talks with others to receive instructions and discuss operational procedure.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

PHOTOGRAPHIC PROCESSING

PACO MACHINE OPERATOR - ROLL FILM (Cont'd)

5. Details of Working Conditions: Works alone, inside, in adequately ventilated, almost totally dark room, unpleasant odor because of the evaporation of chemicals.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed:

Worker:

- a. Takes a loaded film hanger from the dolly which has been placed at his side by another worker and places each end in a notch of the loading brackets with the envelope facing away from him. (The film hanger is a stick approximately 22 inches long, to which are affixed five, 3-part clips - one upper for holding identifying envelopes and two lower for film).
- b. Starting at one end of the stick, removes the roll of film from the roll clip and unwinds the paper until the free end of the film is reached.
- c. Drops the spool and paper and inserts the end of the film in the lower portion of the clip.
- d. With his finger follows the edge of the film to the other end, tears the paper away and drops it and the spool into the waste can at his side.
- e. Takes a weighted clip from a convenient tray and attaches it to the end of the film.
- f. Repeats this procedure with each of the remaining rolls.
- g. Grasping the ends of the hanger with both hands, picks it out of the notches of the loading brackets, moves it forward about a foot, and sets it into a pair of notches on the feed chains just under or preceding the positioning bars. (If this position is already filled, the holder is placed in the next open position).

NOTE: Film should always be grasped at the extreme edge and care should be taken not to allow it to slip out of the fingers and re-roll itself.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

PHOTOGRAPHIC PROCESSING

PACO MACHINE OPERATOR - ROLL FILM (Cont'd)8. Equipment as Found in the Particular Plant Surveyed:

- a. Identification: Paco developing machine (large size); film hangers; dollies; weighted clips; clip tray; trash can; sink with running water; five gallon mixing buckets and mixing paddles; liquid thermometer.
- b. Set-up and Maintenance:
 1. The operator is required to check the temperature of the developing solution twice a day or at the beginning of each run of film.
 2. The rate of progress of the film through the chemical baths may be adjusted when necessary by setting the belt onto the proper step of the motor pulley. The temperature and/or the age of the developer will determine on which step of the pulley the belt is to be placed. It is essential that a blind operator check on the appearance of the film periodically with a sighted person in order to ascertain that the developing time is correct for the condition of the developing solution.
 3. It is necessary to switch on the drying equipment before each run and switch it off after the run is completed.
 4. Whenever the level of the developing or other solutions is an inch below the full line, the tank must be replenished. The operator is required to mix his own solutions, using water and standard single batch packages of chemicals.
- c. Modification: See Item No. 16 for explanation of Braille thermometer.

9. Equipment Variations Which May be Found in Other Plants:

Essentially the same in all plants although in a few instances minor variations will be found where an owner desires to modify the Paco equipment or to design and complete his own.

10. Usual Pre-employment Training: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

PHOTOGRAPHIC PROCESSING

PACO MACHINE OPERATOR - ROLL FILM (Cont'd)

11. Usual Training Procedure on the Job: An experienced worker or foreman instructs the new worker in all steps of the job and tapers off his instruction and supervision as the worker's knowledge and skill increase.
12. Any Training Deviations Suggested for the Blind:
 - a. A blind person must be taught to read the Braille thermometer accurately before being placed on the job.
 - b. Before being taught the routine of processing films, the worker should know the lay-out of the darkroom, all the parts of the machine and their action, the location and on-and-off positions of all switches, the storage location and method of identifying packages of chemicals, and the location of such items as mixing buckets, paddles and towels.
 - c. The operator should be taught to check the light switches every time he enters the darkroom.
13. Production:
 - a. Full: 250 to 300 per hour
125 to 150 on the junior machine
 - b. Time to Reach Normal Efficiency: One month
14. Interrelation with Preceding and Succeeding Jobs: The output of the plant depends largely upon the operator's ability to keep the feed chains filled at all times. Interruptions in the operation of the machine have no material effect upon the preceding operations.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind:

A Braille liquid thermometer may be obtained from the American Foundation for the Blind, 15 West 16th Street, New York, N. Y. This thermometer can be read accurately by touch.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: None

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF PACO PLANT SURVEY.

PHOTOGRAPHIC PROCESSING

PACO MACHINE OPERATOR -ROLL FILM (Cont'd)

17. (continued)

- b. Conditions affecting Suitability of a Particular Job:
 - 1. For the Totally Blind: None
 - 2. For the Partially Sighted: None
- 18. Avoid the Following Conditions: Additional duties which cannot be performed without the use of sight.
- 19. Other Jobs Often Combined for Full Time Employment: None
- 20. Industries, Parts of Industries or Types of Plants Where This Type of Job is Frequently Found:

Developing and printing laboratories; developing departments of Chain Drug Stores and photographic supply companies.

LOOK FOR THIS TYPE OF JOB IN THE COURSE OF EACH PLANT SURVEY.

PHOTOGRAPHIC PROCESSING

X-OMAT FILM PROCESSING MACHINE OPERATOR - X-RAY

1. Name Used for Position in Plant Surveyed: X-Omat Darkroom Technician.

D. O. Title: X-Omat Machine Operator (Any industry)

Code: 9-86.39

Alternate Title: None.

D. O. T. Definition: Not compiled.

Items Worked on in Plant Surveyed: In developing this job description, a totally blind representative of the Division of Services to the Blind and competent representatives of another national private agency examined this job in two different settings:

- a. The job was surveyed in a military hospital and the following items were observed:
 1. Unloading exposed film from cassettes, placing the exposed film in the storage bin below the feeding table to the X-Omat developer;
 2. Reloading cassettes with new film;
 3. Removing film from storage bin and feeding it into the developing machine; and
 4. The storage tanks for chemicals and water with the accompanying automatic replenishing equipment; and
- b. In the civilian or non-governmental hospital, in addition to working on the above items, the representative observed that the exposed films were brought to the darkroom in film boxes rather than in cassettes. It was observed in both the government and non-government hospital the use of the X-Omat machine eliminated the need for hangettes.

2. Usual Operator:

a. Sex: Male or female.

b. General Characteristics: Trainable, possessing average intelligence, and over 18 years of age.

3. Physical Demands:

X-OMAT FILM PROCESSING MACHINE OPERATOR - X-RAY

- a. Activities: Standing, walking, handling, carrying, pulling, pushing, and feeling.
- b. Working Conditions: Inside, dry, dark, well-ventilated, works alone.
- c. Skill Required: A worker is required to have good manual dexterity and the ability to exercise good judgment.
4. Details of Physical Activities: Standing constantly, the worker pulls the loaded cassettes through the incoming side of the pass box, unfastens the cassette cover and removes film from it; replaces unexposed film in the cassette and pushes the cassette through the outgoing side of the pass box; after unloading the cassette, he carries the film and places it in the storage bin below the feeding table to the film processor; removes single film from the storage bin; feels the leading edge of the film and places it on the feeding table with one edge of the film against the film guide.
5. Details of Working Conditions: For the most part, the darkroom technician works alone in the darkroom without light, except for a dim inspection light which is turned on as needed. The work area is dry and free from odors, and well-ventilated (in most instances, it is air-conditioned).
6. Hazards: There is nothing in the work area that would interfere with the health or the physical safety of the worker.
7. Sequence of Steps in Position in Plant Surveyed:
 - a. The worker receives the loaded cassettes through the incoming side of the pass box.
 - b. Opens the cassette, removes the exposed film, reloads the cassette with unexposed film.
 - c. Pushes loaded cassette through the outgoing side of pass box.
 - d. Carries exposed film to the feeding station of the X-Omat. If he has several films, worker places them in storage bin just below the feeding table.
 - e. Removes one film (any size) from the storage bin, feels the leading edge of the film to detect tears, crimps, or wrinkles.
 - f. Places the film on the feeding table with one edge against the film guide, pushes the film forward until it is picked up by the rollers which carry it through the developing processes.

X-OMAT FILM PROCESSING MACHINE OPERATOR - X-RAY

- g. When the chime sounds, the worker repeats the above procedure. (Note: In some civilian or non-government hospitals, the films are delivered to the darkroom in a film box instead of the cassette. In that case, the darkroom technician has no responsibility for either loading or unloading the cassette. This procedure is sometimes followed in hospitals where there are X-ray technicians training schools and the trainees are required to feed their film through the machine.)
8. Equipment as Found in the Particular Plant Surveyed:
- a. Identification: Feeding station of the X-Omat, work tables, cassettes, film boxes, automatic chemical and water replenishing equipment, developing and drying section of X-Omat, and film sorting tables.
- b. Setup and Maintenance: In the darkroom, the worker is required to exercise good housekeeping practices. Service and maintenance of the X-Omat is under the supervision of the supervising X-ray technician. If maintenance and repair is required, a maintenance engineer is called in for this purpose. The X-ray technician supervises the mixing of chemicals and normal service on the X-Omat.
- c. Modification: None.
9. Equipment Variations Which May Be Found in Other Plants: In those hospitals where the X-Omat has been installed, there will be no variations in equipment; however, there might be a slight variation in methods of handling film as indicated in the NOTE to item 7.
10. Usual Pre-employment Training: None.
11. Usual Training Procedure on the Job: On-the-job training was discussed with two supervising technicians and they were of the opinion that a worker could be trained on the job. They concluded that ordinarily a person could be trained to perform the duties and reach production requirements in the darkroom in two weeks.
12. Any Training Deviations Suggested for the Blind: As indicated in Item 11.
13. Production: Actual day-to-day production will be determined by patient load of the hospital and the darkroom technician will be expected to produce in accordance with that patient load. However, the X-Omat has some features which make it possible for a hospital to increase the X-ray services to

X-OMAT FILM PROCESSING MACHINE OPERATOR - X-RAY

patients. For example, the X-Omat will develop four 14" x 17" films per minute or 240 films per hour. It is entirely possible for a worker to process 1,200 to 1,500 films of mixed sizes in an 8-hour period.

14. Interrelation with Preceding and Succeeding Jobs: The job of a darkroom technician is a vital link between the taking of the X-ray and the film clerks who sort and place the films in the envelopes for the patient's doctor to read.
15. Teaming With Other Workers: The darkroom technician works alone and does not team with other workers as such; however, he must cooperate so that the processing of films may proceed in an orderly fashion.
16. Modification, Deviation, Special Tools for the Blind: Since the blind worker will be required to determine when the machine is functioning properly by observing the light signals on the light panel of the feeding station, he may require an audiviz probe. This instrument will enable him to distinguish the various light signals on the panel. The audiviz may be purchased from the American Foundation for the Blind, 15 West 16th Street, New York 11, New York.
17. Sight Requirements and Conditions:
 - a. Vision Required for the Job: Vision is not required in the performance of the duties in the darkroom.
 - b. Conditions Affecting Suitability of a Particular Job: As stated above, vision is not required in the performance of the duties in the darkroom; however, if a darkroom technician is required to assist the supervising technicians in servicing the machine, a person with partial vision will be required for this job.
18. Avoid the Following Conditions: None.
19. Other Jobs Often Combined for Full-time Employment: There has not been sufficient experience with this machine, as of this date, to determine whether or not the darkroom technician will be required to perform other jobs to fill out a day's work. In surveying the job for a blind person, careful consideration should be given to this fact because the X-Omat automatically increases production in the X-ray department through rapid development of the X-ray film. In some instances, the darkroom technician may be required to assist the X-ray supervising technician in servicing the machine and performing other housekeeping duties in the department.

X-OMAT FILM PROCESSING MACHINE OPERATOR - X-RAY

20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found: This type of unit may be found in Government-operated hospitals, civilian or non-government hospitals, and X-ray departments of industrial concerns (particularly metal processing firms).

DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington, D.C.

June 24, 1960

REHABILITATION SERVICE SERIES NUMBER 58 - Supplement 20

TO: Divisions of Vocational Rehabilitation; Commissions and
Other Agencies for the Blind

SUBJECT: Supplement to the Handbook of Representative Industrial
Jobs for Blind Workers - Category GC-11 - Photographic
Processing

The attached job description on Motion Picture Film
Pre-splicing should be inserted as a supplement to Category
GC-11 - Photographic Processing, Part II of the Handbook.

Like all other jobs issued in the category, this
job has been observed and tested by a totally blind staff
member of the Division of Services to the Blind.

The job description, with page number, should be
listed in the appropriate Table of Contents - Category
GC-11 and Part II, General Coverage Series.

Louis H. Rives, Jr.

Louis H. Rives, Jr.
Chief, Division of
Services to the Blind

Attachment

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MOTION PICTURE FILM PROCESSING

PRE-SPLICING MACHINE OPERATOR - MOTION PICTURE FILM

1. Name Used for Position in Plant Surveyed: Pre-splicing Machine Operator

D. O. T. Title: Film joiner

Code: 7-86.060

Alternate Title: Film assembler, splicing machine operator.

D. O. T. Definition: Splices together the ends of short rolls of motion picture film with a splicer and winds the film onto reels by hand: Sets a reel of film on the shaft at each end of a rewinding device and pulls ends of film on each reel toward center of bench. Squares ends of film by lowering knife of splicer. Scrapes emulsion from front of one end of the film and brushes film cement over scraped end. Places ends of film together accurately, and brings down bar of splicer to apply pressure for a few seconds until cement has set. Inspects film as it is wound onto one of the reels.

Items Worked on in Plant Surveyed: Rolled film. Operation involved the use of: film dispenser, film numbering machine, splicing machine, and film winding machine. A totally blind representative of the Division of Services to the Blind, tested, evaluated, and performed this job under normal working conditions in a company engaged in the processing of motion picture film.

2. Usual Operator:

a. Sex: Female

b. General Characteristics: Trainable, average intelligence, good health, good manual dexterity, able to take supervision, and over 18 years of age.

3. Physical Demands:

a. Activities: Sitting, reaching, grasping, lifting light weights up to 3 lbs., manipulating numbering machine, feeling, measuring, and cutting with scissors or knife.

b. Working Conditions: Inside, dry, dark, air-conditioned, free of dust and other foreign matter, little noise, and works alone.

c. Skill Required: This is a semi-skilled production operation requiring good manual dexterity, hand and foot coordination, and the ability to exercise good judgment.

4. Details of Physical Activities: Worker sits on stool in front of machine, reaches to lower conveyor at left end of machine; removes small carton; places it on dispensing reel at left end of table; inserts end of film and carton lid into numbering machine; numbers film and carton lid for identification purposes. As film feeds through splicing machine onto reel winder at right end of table, worker feels the film for tears, cuts, dents, and other abrasions; removes reeled film from winder; places it in film can; lays film on gravity conveyor at left end of machine for transport to next work station.
5. Details of Working Conditions: This job is in an air-conditioned room. There is no dust, foreign matter, or unpleasant odors. The work area is completely dark, illuminated only by a panchromatic light. The work is light and fast.
6. Hazards: None
7. Sequence of Steps in Position in Plant Surveyed: Materials are brought to the work station by conveyor. Worker sits in front of the machine, reaches to the left and removes a carton containing 30 rolls of film from conveyor; sets carton on work table; removes roll of film from smaller carton; places rolled film on a dispensing sprocket at left end of table; checks end of film for marker indicating length of film to be torn off; places end of film against stop on work table; runs finger along film to locate marker at which waste film is to be torn off; tears the film off; places end of film and lid of small carton in numbering machine; pushes button with left foot to activate the numbering machine; removes film and carton from numbering machine; drops carton into "tote-can"; pulls film to center of table; places it on splicer head over the end of film running to right toward winding reel; places silver brad underneath the two strips of film; brings splicer head down with right hand, bradding the film together; pushes button with right foot to activate reel winder.

Operation is repeated until 30 rolls of film have been spliced and wound onto reel at right of splicing machine; as film is wound onto reel, the operator inspects film by touch for tears, cuts, dents, and other abrasions as it passes between thumb and forefinger of right hand; removes reel from winder; places it in black paper bag; packs bagged film roll into film can; seals film can with masking tape; and places can on gravity conveyor at left end of machine. This process is repeated continuously during a normal work day.

8. Equipment as Found in the Particular Plant Surveyed:
 - a. Identification: Power conveyor; gravity conveyor, numbering machine, splicing machine, reel winder, scissors, knife, "tote-cans," stool, and work table.

- b. Setup and Maintenance: No set-up required. Maintenance work is performed by plant mechanic.
 - c. Modification: In some plants the winding of reels is done by hand. The splicing is done by gluing two ends of film together and bonding them with heat under pressure.
9. Equipment Variations Which May Be Found in Other Plants: Hand-operated reel winders and "hot-head" press for splicing film.
10. Usual Pre-employment Training: None
11. Usual Training Procedure on the Job: New worker observes an experienced splicing machine operator perform his job for about eight hours. The second and third days, the experienced machine operator observes and instructs the new worker in performing the various operations in film splicing. The new worker reaches minimum production in about ten days and maximum production in about six weeks.
12. Any Training Deviations Suggested for the Blind: None
13. Production: Full production should be reached within six weeks after employment.
14. Interrelation with Preceding and Succeeding Jobs: This is the first work station in the production line. All succeeding jobs are dependent on the quantity of production from this station in order to meet their production requirements.
15. Teaming with Other Workers: None
16. Modification, Deviation, Special Tools for the Blind: None
17. Sight Requirements and Conditions:
- a. Vision Required for the Job: None
 - b. Conditions Affecting Suitability of a Particular Job: This job can be performed, in its entirety, without sight.
18. Avoid the Following Conditions: None
19. Other Jobs Often Combined for Full-time Employment: None
20. Industries, Parts of Industries, or Types of Plants Where This Type of Job is Frequently Found: This job is found in commercial film processing plants that develop motion picture film for individuals, educational institutions, business firms, public relations firms, and motion picture studios.

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Office of Vocational Rehabilitation
Washington 25, D.C.

November 14, 1950

REHABILITATION SERVICE SERIES NUMBER 58 - SUPPLEMENT 12

TO: Divisions of Vocational Rehabilitation (in States with no Separate Agency for the Blind); Commissions and Other Agencies for the Blind

SUBJECT: Supplement to Handbook of Representative Industrial Jobs for Blind Workers - Part III - Job Analysis with Respect to Blindness

The attached information entitled "Job Analysis with Respect to Blindness" is to be inserted in the Handbook of Representative Industrial Jobs for Blind Workers as Part III. The information given in this part of the Handbook is designed to supplement the information already available from many sources on job analysis. In general it is intended to give the procedure and additional techniques which apply particularly to determining through the job analysis process to what extent an industrial job is suitable for performance without the use of sight.

"Job Analysis with Respect to Blindness" has been reviewed and confirmed by the Placement Methods Division, United States Employment Service, Bureau of Employment Security, Department of Labor.

Before proceeding to analyze jobs to determine their suitability for blind workers, the job analyst should have been fully acquainted with the theory and practice of ordinary job analysis without any particular reference to blindness. He should then approach analysis with respect to blindness in the light of generally accepted methods plus the factors introduced by blindness. Necessary deviations from regular procedures will readily become apparent as they may apply to the category of jobs being investigated.

The analyst's knowledge of job analysis, methods, and procedures will enable him to make the best use of the services and cooperation of any job analysis personnel in the plants being surveyed.

Additional copies of this supplement or any other parts of the Handbook will be furnished upon request. We trust that this material will be helpful and would appreciate any suggestions for improvement which you might have to offer.

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Richard H. Baberstein
Richard H. Baberstein
Assistant Director

HANDBOOK OF REPRESENTATIVE INDUSTRIAL JOBS
FOR BLIND WORKERS

PART III

Job Analysis with Respect to Blindness

Introduction

This part of the Handbook gives an explanation of how to make a physical demands analysis of a job with special treatment of the problems involved in doing the job without the use of sight.

In the main, the job analysis procedure set forth in the Training and Reference Manual for Job Analysis by the United States Department of Labor is followed with modifications necessary to provide the information required with respect to blindness.

The analysis of industrial jobs to determine the possibility that blind workers can perform them has two basic parts; namely, securing full information about the job, and authenticating by performance, without the use of sight, the practicality of any "alternative methods" which a blind worker would use in performing the job.

A sighted person habitually relies on visual perception for much information and direction in the performance of a job. Since the job analyst is trained to report the job the way it is being done by the worker, he necessarily shows that sight is a requirement. However, this may not necessarily be the only way in which the information can be obtained by the blind worker.

The job analyst who would determine the feasibility of jobs for blind workers may follow the usual path part of the way, then he must alter the principles upon which he works if the possibilities for doing a job without the use of sight are to be determined. The job analysis should be divided into two phases: the first is the standard four-part job analysis formula; namely, what the worker does, how he does it, why he does it, and the skill required to do it; the second phase is composed of the additional points which must be considered. They are: how else can each task be performed, what extra skills are required in doing them, and what pattern of safety must be followed in performing these tasks (sighted persons habitually use sight even when it is not required).

In the first phase, the analyst is trained to report facts as he sees them. These facts are gathered from the observations of tasks being done at different positions. They are then combined into one job analysis. The information up to this point remains in the form of facts

observed in action and will almost always show that sight is being used. From there on the analyst must change the procedure. Picking up the second phase, he must visualize "alternative methods" and then determine the adequacy of these methods for doing the task, without the use of sight, by trial on the position being analyzed. "Alternative methods" suggested for a particular operation must be tested for speed and accuracy and for the safety of the blind and other workers.

To arrive at the proper conclusions will require considerable skill and knowledge on the part of the analyst of the methods used by blind persons in performing various operations. It is usually found to be most satisfactory if the analyst is himself a well-trained blind person. He should have had actual experience in doing a wide variety of work under the condition of total blindness.

JOB ANALYSIS PROCESS

The process of job analysis is composed of a series of analyses of the job made at different positions summarized with a particular objective in mind. A job analysis with a sighted worker in mind is often said to be contained within a four-point formula which invariably shows that sight is a requirement for at least some portion of the job. This same basic formula applies when analyzing jobs with blind workers in mind but with three additional considerations: (1) How else could the work be performed by a blind person; (2) extra skills required; and (3) establishment of a pattern of safety.

Analysis Formula

A fuller understanding of each part of this formula may be had from an explanation in Guide for Analyzing Jobs published by the Department of Labor, 1944 (reprinted 1946).

1. "What the worker does involves the physical and mental responses that are made to the work situation. Physically the worker may transport materials, cut, bend, grind, put together, make ready, set up, tear down, insert, regulate, clean, finish or otherwise change the position, shape, or condition of the work by the expenditure of physical effort. Mentally the worker may plan, compute, judge, direct, or otherwise govern the expenditure of his own or others' physical effort by a corresponding exercise of mental effort. In a given job a worker may expend any combination of physical and mental effort required by the task.

"In determining What the worker does, the analyst must establish the complete scope of the job and consider all of the physical and mental activities involved.

"Most jobs involve more than one task and each task may involve different physical and mental activities. The analyst must determine the tasks and report and describe

them in direct terms so as to present a clear and coherent work picture. This may be done by describing the tasks chronologically or by grouping them according to their nature, depending on which creates the clearest presentation."

The following are six considerations for "what the worker does":

"What tasks have been observed in the job?"

"Are there additional tasks which have not been observed?
Are these additional tasks customary for all workers on the job?"

"Are the tasks included for this job performed by all workers designated by the job title?"

"What is the frequency with which the tasks are performed?"

"What is the relative difficulty of each task as compared with the rest of the tasks of the job?"

"Has the data obtained by observation been verified with the proper authority" or personally tested by the analyst?

2. "How the work is done concerns the methods used by the worker to accomplish his tasks. Physically this involves the use of machinery and tools, measuring instruments and devices, and other equipment by the following of procedures and routines, and the movements of the worker himself. Mentally the methods lie chiefly in the "know how" that must be applied to the tasks. This may involve the use of calculations, formulas, the application of judgment or decision, or selection and transmittal of thought. The worker may use a single method to accomplish a task or he may have at his command several alternative methods, any of which may be used with equal success."

The following are four considerations for "how he does it":

"What tools, materials, and equipment have been used to accomplish all the tasks of the job?"

"Are there other tools, materials, or equipment which have not been observed? If so, how do they work?"

"What methods or processes have been used to accomplish the tasks of the job?"

"Are there other methods or processes in the plant by which this same work can be done? If so, what are they?"

3. "Why a worker performs his job is the purpose of the job itself and is indicative of the relationships among the tasks that comprise the total job.

"The Why outlines the scope of the job and justifies the What and How of the work performed. The over-all purpose, of course, is the sum total of the purposes of all tasks. Utmost care is necessary in ascertaining and recording the reason why each task is performed, both to clarify the over-all purpose of the job in the reader's mind and to show task relationships as the job progresses to the completion of a work cycle.

"The purpose may be the conversion of material from one form to another, the maintenance of conditions under which other jobs can be performed, the catching or preventing of errors, the development of new methods or the improvement of existing methods, and so forth. Failure to explain this purpose will leave the impression that the job has not been reported completely, and tends to ambiguity in the description of the job.

"The purpose or Why of the job is the first thing the analyst must ascertain in order to orient himself for the subsequent analysis."

The following are three considerations for "why he does it":

"Why is the job done? What is its over-all purpose?"

"Why is each task done? What is the purpose of each?"

"What is the relationship of each task to other tasks and to the total job?"

4. "The Skill Involved. This part of the Job Analysis Formula brings out important information necessary to supplement the What, How, and Why and to express the degree of difficulty of the work tasks involved in the job.

"It consists of a listing and an explanation of the basic factors which must be considered in analyzing any job. These elements bring out the manual skills, knowledges, abilities, and other characteristics required of a worker by his job, regardless of whether that job is manual, craft, professional, clerical, or other type. It may be considered a guide list to aid the analyst in obtaining and recording all the information necessary to discriminate between jobs and to establish the degree of difficulty of any job."

For a more complete discussion of job analysis procedures the analyst may refer to the Training and Reference Manual for Job Analysis which is the Department of Labor's standard reference on the subject or other equivalent publications such as Manual of Instructions for Navy Occupational Analysis NAV. PER. 15-809.

(1) How else could the work be performed by a blind person?

The first additional consideration that must be satisfied before approving a job for performance by a blind worker is "how else" can each task be done. For this purpose many alternative methods of perception are available. Alternative methods of perception are those used by a blind person to obtain information about an object, condition or motion, which information is ordinarily obtained by a sighted person through visual observation.

The alternative methods may or may not be readily apparent to the analyst; however, if the analyst is a blind person, he may naturally use these alternatives. Although a sighted person uses visual perception for much information and direction in performing a job, this may not necessarily be the only way in which the work can be accomplished. He should be cognizant that he is using alternative methods of perception and should record their use. Some of the alternative methods are as follows:

Visualization: This is the translation of a verbal description of an object, operation, process, or condition in order to bring to him the same understanding of it as the sighted person obtains from blue prints, drawings, or direct visual appraisal itself. One of the most common uses of visualization is the blind person's travel to a given destination when the only directions available are the verbal description of the route to be taken. Even then at some place the blind traveler may have to put together the sounds and other signals and visualize the unexpected condition being encountered such as a building front under repair but not mentioned by the original informant.

The blind worker in industry may very frequently be called upon to visualize not only the simple operations he is performing but also be able to relate them to the over-all picture of the process or completed object to be made. He must also visualize what is going on in the machine he is operating. A simple example is that of a flatwork feeder in a laundry who must understand the action and functions of the smoothing roll and the first hot roll and shoe and their physical layout in order to be able to pull back quickly the article being ironed in case it has started in crooked. The picture resulting from the visualization is the blind person's "blue print", sketch, plan, and specification of the work to be done.

Memory: In addition to the usual information which any worker must remember in order to do properly a task, the blind worker is nearly always called upon to remember items, conditions, procedures, and other information. This may be in the form of a conscious remembrance of things from one day to another or from one week to another. It may be the remembrance of the definite sequence of steps followed each time the blind worker performs the cycle of operation.

Again it may be almost automatic muscle memory such as is done when comparing the weight of each article to the preceding sample, or it may be retaining the sense of the proper resistance to one piece fitting into another. It may be that as the positions in a packing case are filled, the blind worker may always remember the location of the filled compartments and automatically place each succeeding item in the proper compartment not yet filled. Upon the reassignment of a particular operation to a blind worker after days or weeks on other work, the blind worker may need to remember the instructions, which the sighted worker gets from an accompanying instruction card. An example is that of a turret lathe where the sequence of the various steps can be determined at a glance by the sighted worker. The blind operator must remember them in order to govern properly his manipulation of the control and what reaction to expect at each point. The automatic remembrance of the degree of force required to accomplish a certain step may allow the blind worker to accomplish properly the step in the operation for which the sighted worker usually relies upon the appearance of the resulting shavings.

Hearing: The blind worker can learn to interpret sounds so accurately as to obtain much of the information usually obtained by sight. It will take practice, study, and good imagination in many cases to develop proficiency at interpreting the sounds in a useful manner. Some of the examples given here will indicate the possibilities for gathering information by hearing. The repetition of a certain noise in a machine may indicate that it has completed its cycle of operation. This may coincide with the typical vibrations giving the same indication. A steady sound may indicate that everything is working properly; that a cycle or step has been completed in the operation; or that something has gone wrong with the equipment. Each machine must be checked, for its sound signals may be different from those observed in some other machine. As an example, a power hack saw cutting through a piece of material changes its sound as it nears the completion of the cut. As the cut is completed, the saw frame drops down and trips the stop lever giving off another characteristic sound. The piece cut off may make a noise when it drops to the floor. The worker can judge by the sound when the cut is nearly completed and can take hold of the piece being cut to keep it from falling.

The general noise in the room, in many cases, will indicate what other activities are going on. The general cessation of noise may indicate that the end of the shift is near and it is time to stop and

clean up the machine. When the blind worker teams with a sighted worker on a job, verbal directions by the sighted operator may supplant the usual methods used by two sighted workers to keep themselves properly synchronized. Certain distant sounds may be used by a blind worker to maintain his general orientation and direction with respect to his work position or places to which he has to move in the course of his day's work. This may be very helpful when he is required to travel short distances to obtain supplies and dispose of work or when safety conditions allow him to travel alone for other purposes. The arrival of supplies may be indicated by the noise of a truck or by the starting up of a conveyor belt or other piece of equipment. The characteristic noise of the timer clicking along and terminating with the ringing of a bell or buzzer at the end of a period will be an indication that the time has elapsed for a certain portion of the process; such an example is found in the process of developing film. The approximate temperature of a metal surface such as that of a hot plate or a soldering iron may be checked by moistening the finger and touching it quickly causing a sizzling noise occasioned by the rapid evaporation of the moisture. A change in the sound of water running into a container may tell the blind worker how full it is.

Feeling: To the blind person a sense of feeling is an important factor in obtaining information. Valuable means of identification through feeling are the character of the surface, the density, rigidity, and motion of the object contacted or of other things linked to the object as well as its general shape and proportions or its characteristic parts. The following examples indicate some of the feeling response which may be found.

The characteristics of a surface can be detected by touching it with the fingers. This contact may be used to determine the right side of a sheet of paper or cloth where there is a difference in texture on the two sides; it may be used to determine whether all the burrs have been removed from the edges of the item; or whether a piece is plain steel or has been plated.

On occasion where perception through the finger tips is not sensitive enough to pick up the fine details necessary, some blind persons use the tip of the tongue. For instance, in working with a stack of fine lamination for an electric instrument it was necessary to find the side which carried a milled surface only a few thousandths of an inch deep. The blind worker first studied the surface with the tip of his tongue until he had very clearly in his mind all the features of the surfaces, distinguishing the milled surface from unmilled edges of lamination. From there on he knew well enough what his fingers would be looking for so he could be sure that the correct side was up.

The fingers may be moved over a surface to identify the location of holes, slots, or other certain characteristics of an article. The fingernails or a pointed scribe may often be used to locate engraved lines, cracks, or scribe lines. An example of this act would be the

reading of micrometers by identifying the deepened engravings on the instrument with the fingernail. The fingertips may be used to identify loose objects as insulators, coils of wire, bolts, nuts, lag screws, sockets and other items and parts of machines as switch buttons and feed levers.

By feeling with the fingers a selected smooth portion of the machine the operator can safely determine whether or not the machine is in motion and its direction. The resistance to motion and/or the vibration felt on the handle of the machine may be an indication of the progress of the work as well as difficulties or irregularities in the operation of the machine. The rapid boiling off of the soldering flux with which the tips of a small bundle of wires have been coated sets up a vibration in the wires which indicates that these have been immersed in the molten solder, and the cessation of the vibration advises the operator that the tinning process has been completed. The feeling of vibration may supplement or work together with certain sound conditions to give the blind person a good picture of what is happening.

Certain sensations referred to as "feeling" are the reactions of the muscles in the fingers, hands, arms, or the entire body to resist or cause motion of an object or part. After having experienced such a sensation, the muscles seem to recognize the repetition of the situation or to judge the difference. This feeling sensation is spoken of as "muscle memory". In many cases the alternative method used by the blind person is some form of this sensation in widely varying degrees. By the touch of his fingers the operator can determine when a certain part has been inserted in the right way or to the right depth in a hole or a chuck; many similar determinations can be made by touch. Also, the resistance with which one part passes through or over another part may be used as an inspection device to indicate the size or to determine whether the proper fit has been obtained between two pieces. (Note: When using the fingers to feel in this mode of identification, care should be taken that a definite safety pattern is adhered to when working around the machine.)

The degree of tension of a flexible surface such as cloth, cellophane, or paper can be observed by putting pressure against it with the fingers or hands. The feeling in the handle of a hammer as the blow is struck on the head of a nail, indicates whether the nail is going straight, is meeting with heavy resistance, or is clear down in place. The reaction of a hand saw or plane on the wood will be an indicator of the density and/or the grain. Resistance offered by the handle of a wrench can be used as an indication of the tightness of the bolt or nut or as to whether there is dirt or grit in the thread.

The surface condition of the floor as observed through the feel of the feet as a person walks may be used as definite indicators of position or in some cases direction. Up or down grades are easily detected by a blind person as he walks along and may in some cases

serve as indicators of position. By feeling at the edges of rubber mats and platforms with the feet, he is able to maintain location. The feet will detect the change from wood to concrete or vice versa, thus indicating the approach to a stairway, the entrance to a doorway, or other important locations.

The weight of an object or container is often sufficient identification so that the blind worker may distinguish it from others. For instance, an aluminum object of the same size and shape will be a lot lighter than one made of ferrous metal, and this immediately suggests to the worker which type of item he has in his hands. The weight of a board in proportion to its size will indicate whether it is soft or hard wood. The feel of the weight and balance of a rod may be sufficient to indicate its length or may allow the blind worker to select the proper rod from among those of different lengths. The heft of a bag may be sufficiently striking to indicate whether it is filled with shavings or cement.

In some cases the speed with which items are being handled will contribute to the accuracy with which the sense of feeling will give the blind worker the comparison necessary to distinguish the characteristics required. For instance, in the operation of a semi-automatic machine for making cellophane bags the blind operator was able to distinguish and set aside those with defective seams. There was only a very slight difference in the pull required to remove the bag from the forming plate. Working at the rate of six to seven hundred bags an hour the comparison was easily distinguished. However, if a period of a minute elapsed between bags the same worker could not pick up the distinction.

Radiant heat, which may be felt on the hands or face, is a good indicator of direction and may help the blind person to maintain good orientation with regard to the machine or other objects. For instance, the heat from an incandescent lamp, oven, drying kiln, or solder pot can be definitely felt and used to maintain one's position with respect to a piece of machinery, the openings in the kiln, or its front surfaces. The stream of warm air arising from a heated surface may add to and supplement the information obtained from the radiant heat.

The feeling of air currents against an uncovered portion of the body such as the hands or face may be all the indication necessary to direct the blind operator on a certain course or in his approach to a part of the machinery. For instance the breeze coming in through an open window known to be forty-five degrees from the center line of the machine will help a blind worker to retain his orientation to the main line of machinery itself. Air currents through an open door help him, when traveling by himself, to find the opening quite accurately. Also, the current of air thrown off by a fast-revolving, grinding wheel provides a definite path along which to approach the wheel. Similarly a jet of air for blowing away chips may also be an indicator of a definite part of the machine which the worker can locate by moving his

hand up this stream of air.

Smell: The sense of smell can give definite and accurate identification of many items and conditions such as the following: In the case of three cans of identical size and shape one may contain turpentine, another lubricating oil, and the third linseed oil, all of which are easily distinguished and identified by smell.

The odor of hot lubricating oil on a bearing or overheated cooling liquid on a cutting tool may be used by both blind and sighted workers as their first indicator of trouble in that direction. The aroma of scorched wood or cloth is an accurate indicator that something is wrong with the machinery.

Judgment of Distance and Direction: Judgment of distance and direction must frequently be developed by the blind worker to a high degree of proficiency in order to manipulate properly the tools, handles, or other controls on a machine, or to find rapidly the work on the bench. Proficiency in gross movements must be maintained in order to find supplies or the parts of the equipment or to dispose of material. An example requiring this skill would be removing the finished part from the machine and placing it on a truck or conveyor with or without stepping a short distance, turning partly around with one step, reaching to obtain a new part from the supply truck, and placing it into the machine. Judgment in the rate of change in the position of the controls must in some cases be relied upon to assure the proper feeding of the tool into the work. Often the distance that the handle has moved or the position of rotation of the operating lever of the turret lathe may be used as an indication of the proximity of the cutting tool with respect to the work. Determination of the degree to which the feed handle has been rotated is frequently assisted by thinking of it as the hour hand of a clock rotating through so many hours or to certain positions referred to as 10:30 or 2:00 or 5:00 o'clock. In many of these instances judgment of distance and direction is combined with feeling to give the blind operator a full picture of what is happening. The movement of both hands and arms must often be coordinated with a sense of feeling in order to accomplish a certain step, such as inserting a part in the collet of a hand screw machine. In this operation one hand operates the chuck lever, and the other hand brings the part up approximately to the opening of the collet where it is to be inserted; in this final stage the sense of touch is used both for entering the collet and for determining the distance the part is to be inserted into the collet. With the hand on the chuck lever the collet is made to grip the piece which must be released from the fingers simultaneously with the affecting of the chuck action. Again, the coordination of both hands and arms to accomplish an operation will require bringing them together at a given point in space such as in threading nuts on to bolts. Again the angle at which a tool is held or a nail driven depends on the blind worker's judgment of direction. (Note: In many cases, around moving machinery and cutting tools, the judgment of direction and distance must not be

relied upon when the fingers or hands might come within the vicinity of the cutter or other dangerous parts. Instead definite safe paths must be followed which can be detected also by feel as well as direction. The paths may utilize such parts as grooves, fences, and edges.)

Object Perception: Object perception is the act of sensing the nearness of an object or mass without actual contact with it. Both blind individuals and sighted authorities who have studied the character and use of this sensation differ greatly in regard to its characteristics. Some say it is one form of hearing; others believe that it may be due to an exchange of radiant heat or that there is some form of gravitational effect between the body and the mass of the object causing the sensation. This sensation is sometimes called "facial perception". Blind individuals vary in the extent and accuracy with which they can rely upon it. There seems to be no validated way of measuring the sensitivity of the individual to the sensations.

The sense of object perception may be used in some cases to help the blind worker move safely from one machine to another or around in the machine room or other parts of the plant where he may safely travel alone. This sense, in most cases, will be used in combination with other directional indicators such as sound and feel. For instance, a blind person feeding a number of machines arranged a uniform distance from a wall may travel along the aisle between the machines and the wall. Object perception may help him maintain the correct distance from the wall as he moves from one machine to another. This may be supplemented by the sound from the machines or occasionally touching the wall with his hand. Also according to the characteristics of the machine and the keenness of the blind person's object perception he may use it to tell where he is at the proper location with respect to any given machine. Again a high stack of supply boxes or lugs may make themselves known to the operator through object perception.

(2) Extra skills required

The second consideration in the performance of a job without the use of sight frequently requires certain skills which are not necessary when visual perception is available to the worker. This additional skill may come either as an amplification of a skill used when doing the job by sight or it may involve an entirely new skill.

For instance, a sighted person operating a power hack saw automatically follows the progress of the work by occasional glances; to him the only significant sound signal would be the noise as the piece, which is cut off, drops to the floor and the frame touches the latch to stop the equipment. A worker who operates the saw without the use of sight must have a greater skill at interpreting sounds in order to know that the saw is operating properly and in order to judge the progress of the work by the change of sounds.

Another example is the totally blind man who was successfully operating as a stock clerk in the supply room of a factory. His duties consisted of putting away the newly arrived stock and filling requisitions for the assembly department. In performing the tasks of the job a high degree of skill in orientation and travel without the use of sight was required due to the frequently crowded aisles and the necessity of locating bins quickly and accurately.

A high degree of skill at reading and writing Braille and in the use of abbreviations and symbols was necessary. The job also required a high degree of skill on the part of a blind worker, in recognizing by touch an article picked out of a bin. For instance, the feel of the texture of the surface of a lag screw indicated to him whether it was plated or just plain steel. These skills were necessary if the blind person was to fill orders as rapidly as a sighted clerk who could read the labels on the bins.

As the analyst finds and decides upon the alternative methods of perception which will be used on a particular job, he will also almost automatically find a number of new skills or old ones requiring amplification on the part of the blind worker if he is to do the job properly. Therefore, the analyst might well adopt the procedure of checking the list of alternative methods of perception applicable to each job or task and the corresponding new skills or amplifications of old ones which will be required.

(3) Establishment of a Pattern of Safety

The third additional consideration is the so-called "Four-Point Pattern of Safety." If the requirements of all four points can be met in a positive way, the operation can be safely accomplished without the use of sight.

The first point is to determine a safe approach to, or method of making primary contact with, the equipment to be operated.

It must be assumed that the machine is in motion to a small degree at least. The last part of a revolution of a cutter might do considerable damage to anyone contacting it during this period of quiet, vibrationless coasting. For example, it is often found that a table saw may be safely contacted at the waist-high edge of the table or anywhere lower.

The second is to determine a safe method of observing the state of rest or motion of the machine. Besides determining whether the machine is or is not moving, it may be necessary to know the direction and approximate speed of rotation. The smooth end of the head shaft of a lathe or the arbor shaft of a milling machine may be the place that gives the best indication and be the most easily accessible. Whatever the part selected, it should be such that it would not be inadvertently left out of gear and thus give an erroneous indication.

Third, the blind worker must find definite safe paths to follow in moving his hands to and from points of control and observation.

Fourth, the worker must develop a safe method of observing the progress of the work being done.

All four of these points must be fully satisfied before adjudging any operation to be suitable for performance by a blind worker. In determining this safety pattern for any operation, it may be necessary to rely heavily on one or more of the alternative methods of perception listed above. On the other hand, the blind person's methods of perception, such as sound, feel, and judgment of direction, may already have been adopted by the sighted worker in his system of safe operation of the equipment.

EXPLANATION OF TERMS

In the main two degrees of blindness are referred to. One is "total blindness" under which the blind person must operate without the use of sight. An individual may have light perception or even object perception and still be within the meaning of total blindness because the degree and type of residual sight is of no value in the performance of work and the individual must operate as though completely devoid of light perception. The other is "partial blindness" sometimes called "partially sighted." Persons included in this category of visual measurement are within the definition of blindness but have only the minimum sight required to perform certain work where functions such as the distinguishing of colors or very limited travel must be accomplished by visual perception. When these few functions are performed through the use of "partial sight" the balance of the operation may then be performed by alternative methods used by the totally blind. In such cases it will be impossible for the particular job to be performed by a totally blind person because the perception required cannot be furnished by alternative methods.

The term "job possibility" is taken to mean a situation in which all the conditions surrounding the blind person's employment could be such that he could be a satisfactory competitive employee. Besides the basic operation itself, it may include such tasks as securing and disposing of material, the proper inspection of the product, and making out of production slips or records. There must be a sufficient quantity of this work to keep the worker busy full time day in and day out, or the possibility of coinciding with enough other suitable, practical operations to employ him full time. A job possibility may exist even though the employer is unwilling to hire blind persons or is unable to hire any new employees at the time.

Satisfactory performance must be taken to mean much more than reaching the hourly production rate on the basic operation involved at a given position. It must include such things as working as a team with other workers, the ability to operate steadily, maintaining a good relationship with fellow employees;

it may require the doing of auxiliary work such as securing and disposing of material, detection of defects in the operations, the setting and re-setting of tools, necessary inspection or other factors, if they are required of sighted workers.

MECHANICS OF THE JOB ANALYSIS

Gathering Job Information

The process by which the job analyst searches for jobs which may be done without the use of sight is composed of several distinct parts or steps which may be studied and planned for separately. First is the office interview. During this discussion the placement analyst must obtain the confidence of the management in his ability as an analyst and the value of the program; also he gets an over-all picture of the plant and its processes. From this he is able to develop a plan of procedure for the obtaining of job information and the procedure of testing and correlating it. Second is the travel through the plant to reach the various jobs. This provides good background of conditions with which any blind worker would have to contend. Third is the gathering of information on the job (a) through direct inquiry of the foreman or workers and (b) through performance which is the direct testing of the job by the analyst.

In addition to the basic information on the operation, there must be obtained such additional information as quantity of production, combination with other jobs, inspection, securing of supplies and material, and cooperation with other workers. Incidentally, the doing of the job without the use of sight helps the plant officials to gain a better appreciation of the methods and possibilities connected with performing the operations without the use of sight. Thus they become more helpful to the analyst in his search for job information.

The Desk Survey

This survey is the preliminary locating of types of jobs which the analyst wishes to study. It is the discussion in the superintendent's office of the products made and processes used, as well as those plant conditions that have a bearing on the suitability of the jobs for blind workers. It is during this time that a plan is developed for the survey and testing of operation in the plant. During this time the analyst should explain carefully but quickly to the employer the procedure he will follow in making a survey in accomplishing the objective of obtaining and validating job information. He should explain that besides this the performance of the operations by the blind analyst will demonstrate the safety pattern for each operation, enlightening the foreman on the ease of training procedures and building the enthusiasm of sighted workers for the locating of jobs for blind workers.

Depending upon the type of product being manufactured, it may be advisable to ask the employer to show a few representative samples of the work being done or of his products. A good guess at some of the operations involved in producing the article may help to establish the employer's confidence in the ability of the analyst to accomplish his objective and understand what he sees in the plant.

When planning or discussing the possibilities available, do not overlook side jobs or supporting operations that are merely incidental to, and not part of, the main process. For instance, in a creamery or glass factory the carton set-up may be performed by workers in a separate room from the main-line operations. The cartons come down by chutes or conveyors. In the case of bottling plants, there may be a considerable amount of work required in the repairing of wooden carrying cases. This may be off to one side or in an entirely different room or part of the warehouse.

Advance knowledge of an industry or a particular plant may be gained from many different sources. Such information may be obtained from books and manuals, trade associations, machinery salesmen, union business agents, workers in the industry, employment service contact men, and personal tours of inspection of plants other than the one under immediate survey. This information is usually used indirectly to be sure that the analyst's questions and suggestions are intelligent and in approximate alignment with the conditions found in the industry. It may also enable the analyst to shortcut the discussion of certain portions of the industry which are not pertinent or feasible and thus save time. The advanced knowledge of a particular plant will enable the analyst to direct the employer's attention to those parts of the plant where job possibilities are most likely to be found. Caution should be exercised not to exhibit too definite a knowledge of the possibilities for blind workers in the industry because plants will vary widely within an industry, and indirect information on a particular plant may have been modified or misunderstood in its transmission.

Who Should Be in on the Survey

The free flow of information on different operations will usually be improved if it is generally known that the top officials are interested in the success of the job analyses. It is, therefore, well to obtain the initial general permission from an official with top authority to have this person and other officials come by to observe the analyst doing some of the operations. An effective arrangement is often that of having top management refer the analyst to the superintendent for direct conduct through the plant or for passage by him to the foreman in a particular department. In smaller plants, top management may be very familiar with each operation and capable of instructing the blind analyst during the performance. In larger plants this may fall to the lot of the

superintendent who is still closely familiar with each individual operation and how it is accomplished. However, in the very large plants the section foreman will be the one who knows best the details of how the operations of each position are done and have in mind the other data such as production, inspection, relationship to other jobs, and combination with other positions. It will be up to the good judgment of the analyst to try to get the services of the person who can do the best job in showing him the operation. As he is being passed from one official to another, he should request that each one come along sometime during the job study and observe the performance of one or more operations, so they can appreciate the alternative methods being employed to do the job properly without the use of sight. He should explain the method to his instructor or the official observing the study and demonstration in order to simplify in their minds the feasibility of the operation and thus bring about an easier and more effective flow of useful information. Naturally, the workers in the surrounding area also see the performance and the effectiveness of the alternative methods being used and the practicability of the job being performed by a blind person. In some plants it will be an advantage to have a talk with the shop steward before starting the analysis of particular jobs. If he passes around a word of approval, it may be easier to secure desired information from the workers.

Proper Dress According to Conditions

When performing any operation for study or demonstration purposes, the analyst should always be dressed in keeping with the conditions to be found such as oil, dust, or glue. The dress should always be in keeping with his convenience and safety. This is of utmost importance in many cases for the peace of mind of the employer, the superintendent, and the foreman. If the analyst is operating a machine where cutting oil is splashing around and is trying to do it without any protective garment, the observer's attention is going to be riveted more on the analyst's getting his clothes dirty than upon the skill with which he is performing the operation. In many cases, the analyst might be refused permission to operate certain jobs because of the dirty conditions and the possibility of soiling his good clothes. If, however, he comes prepared with a shop coat or apron, speaks of having a protective garment, and gets dressed in it before going into the plant, that fear and diversion of thought and attention is averted. Protective garments should be compatible with the safety of the job being performed. For instance, the shop coat should have the sleeves cut off and elastic bands inserted so as to hold the coat and shirt sleeves above the elbow. There should be no loose flapping pocket or belt on the shop coat or apron. When preparing to go into the factory, the analyst should leave his suit, coat, hat, etc., in the superintendent's or foreman's office, divest his arms and hands of wrist watch and rings, and be sure that his necktie is carefully tucked in or removed. There may be situations where

an apron or shop coat would be inconsistent with the cleanliness of the operation to be performed such as in the case of a department store marking room where everything is in very clean condition with no chance to soil clothes or hands. In this situation an apron or shop coat would be superfluous and undesirable, but it usually adds to convenience and helps the analyst if he removes his suit coat and leaves it in the office. In bakeries or other food factories the analyst should start with a clean freshly laundered protective garment. This dress and procedure gives the whole performance an air of professional knowledge and thoroughness which will build up the employer's confidence in the demonstration.

Learning from the Side Lines

When starting to survey a particular department or area, the analyst should have his conductor give him a general description of the layout of the section and of the type of operations going on therein. A start will then be made at the beginning of a production line or at a certain part of the department according to previous decision. As each operation is approached, it is well for the analyst to get as good a picture of it as he can from his conductor by verbal description and otherwise without disturbing the worker who is then performing the operation. The conductor can do this by (a) a verbal statement or description of the operation, (b) showing a sample of the work as it comes to the position, and (c) showing and describing a sample of the work when the operator is finished with it.

From this side line information the analyst will make a preliminary appraisal of the job at the particular position, deciding whether it is worthwhile to investigate it further through actual performance of the operation itself. For instance, if inspection for something such as color conditions or ink splashes is essential and the discussion discloses there is no other worker who could make this inspection or no alternative method can be found for making the inspection, then there is no use taking further time for the survey and disrupting the work by performing the other parts of the operation. However, if there is any possibility that it might under some circumstances be found feasible for a totally blind or partially sighted person, the analyst should make a direct personal contact with the operation with the thought that in performing it he may be able to find some alternative method of accomplishing the difficult steps.

Learning by Doing

The first step to be taken toward performing the job is to appraise the effect that the interruption will have on the regular worker's production and any congestion of the flow of material to and from the position. The amount of time then taken to perform the demonstration may have to be governed according to some of these

conditions. Also, if the worker is paid on a unit or bonus basis, the foreman may have a way of compensating him for the interruption. It may be possible to divert material to other workers to avoid congestion, or it may be necessary to wait until the regular worker has caught up on the supply of material coming to the position; and then the analyst should try the job only as long as the congestion does not become serious. Along with other methods of avoiding jams in the production line it will sometimes be possible and advisable to have the instructor or the regular worker continue to perform one or more of the steps in the operation while the analyst is learning the work. As the analyst improves in his performance, he can take on additional steps until he can do the entire operation without congesting the production line. In some cases it may be possible to perform the operation in an adjacent position which is not in regular use at that particular time.

The second step is to reach a decision with the conductor as to who is to teach the analyst the operation. In most situations the conductor and the regular operator have not had experience in teaching blind persons. Therefore, it is usually necessary for the analyst to lead the instruction by asking questions or suggesting possibilities. For example, he should be sure that when a machine is to be operated it is shut off while he is given an explanation of the working parts and controls. Through the question-and-answer method, he leads the instructor over the machine and its operations. Each step in the operation of that position should be brought out in a clear-cut manner.

The third step is for the analyst to develop a safety pattern for the operation of the equipment and to explain it to his conductor and any other supervisory personnel who are observing. The instructor may be brought into this process of developing a safety pattern for instance, by asking him how he determines the progress of the work or that the work is finished. This is especially advantageous where the sighted worker does the delicate parts by feel. It is well to ask for any short-cuts or special techniques which the regular operator has developed. It is frequently found that different operators doing the same job have different techniques and detail. For instance, in the skinning of frankfurters, one operator may accumulate three or four skinned franks in her hand before depositing them in the box, while another worker may find better speed by tossing each one on the table before proceeding to skin the next.

As each step in the operation is reached, the sighted instructor will invariably explain the step in terms of visual observation and the way he or the regular worker would do it. It will be necessary, therefore, for the analyst to develop alternative methods of observation and perception as he goes along. For instance, it may be necessary that the printing on a carton be right-side up when the carton is being filled. This cannot usually

be detected by feeling the surface of the cardboard but the position of the seam, either taped or stitched, with respect to the rest of the box will invariably give the desired indication. Again the proper side of a piece of metal which has been stamped out can be automatically determined simultaneously with the grasping of the piece by feeling the burred edge left by the stamping process. As another example, the progress of the tools toward the work in the operation of a turret lathe is ordinarily determined by the worker watching it with his eyes, while the blind operator will learn to have the feed handle come up to a certain position in the circle of a clock referring to it as 3:00 o'clock, 6:30, or some such position which he has predetermined. This puts the tools at the position ready to start cutting after which the feeding is slower. As the tool begins to cut, there will be a different feel in the handle of the control wheel. By this reaction the blind worker will also be able to determine how well the tool is cutting and when the operation is finished. As soon as the analyst has determined the proper alternative method of perception for any particular step, he should explain it to his instructor or the official observing the progress of the demonstration in order to simplify in their minds the feasibility of the operation.

It is well to let the conductor give instructions on the whole process whether it is needed or not. First perform the operation several times with the help of the instructor. He is usually more impressed if his assistance is used than if the analyst comes in and performs in a show-off manner entirely without instruction. As soon thereafter as the analyst feels confident he can do so, he should proceed to perform the operation step by step without any coaching or assistance, continuing this until he is giving a smooth performance and has satisfied himself of the conditions and feasibility of the job. As soon as he is working smoothly on all steps in the operation, the analyst should secure the approval of the worker, the foreman, and other officials as to effectiveness of the alternative methods being used and the practicability of the job being performed by a blind person. Be sure that any comparison of the analyst's performance is made with respect to that of a new sighted worker starting in on the same job. When the analyst decides that the operations of any given position are at all feasible for a blind worker, there should be a casual recheck made of traffic conditions, break-in time, supplies and material, inspection required, speed or quantity of production attained by the regular worker, and combination with other operations. This at times will be found to be slightly different from the more general explanation first obtained in the office.

Summarization

After the study and performance of the feasible jobs have been completed in a small plant or in a department of a large plant, a general summary on findings should be made if possible with the

foreman and other officials present. At least some official who has observed the performance should be present to join in on the summarization. If possible, get the observer to agree that the results of each job or operation are as the analyst thinks they should be. The summary is likely to show an assortment of other suitable jobs which might logically be performed by the same worker skilled in doing the job analyzed. These combinations should be agreed to during the summarization. This appraisal should be made on the basis of requirements such as sight required, usual training and previous experience, employers' preference for male or female workers or for large or small workers. Situations may be found where the job being considered falls within a group or partnership arrangement and does require some sight as presently operated. Appraisal might well be made on that occasion as to whether or not an equitable reassignment of duties could be made so that all the sight required would come on a sighted worker, leaving the other functions which do not require sight for the blind worker. Management should be satisfied that the change is equitable and convenient for them.

In making the summary, avoid accepting situations where special jigs, fixtures, or other equipment required by the blind worker do not equally benefit the sighted worker. For instance, a group of three or more workers may be taking materials off a conveyor and putting them into packages, and between them they must remove all the items before they reach the end of the belt. When the blind person takes off his share of the articles at the first position, it leaves sighted workers available to keep the end of the belt clear. Or, again, where two persons are working together feeding an off-bearing from a rip saw, it may be required that some selection be made of the wood according to knots and blemishes. The sighted person should assume this responsibility. Also, the sighted operator on a partnership can be responsible for the re-setting of the saw for the different widths of material as required. Frequently, in small plants or large plants having irregular runs of different items according to customer orders, it may be necessary for an employee to operate on several different positions or even different types of work. In that case, the summary should show that there is a large enough assortment of jobs that can be done without the use of sight so that the foreman will have no difficulty in keeping a blind person busy at full production by switching him from one operation to another. These various combinations should be clearly brought out and agreed to during the summarizing. When agreement has been reached that any position or series of positions within the plant can be done satisfactorily without the use of sight, or by persons within the definition of blindness, the positions should then be considered job possibilities whether or not there is an immediate opening for the hiring of a worker.

The following is a suggested schedule for use in checking factors involved in analyzing a job for performance by blind workers.

1. Name used in plant surveyed, also alternative names in other parts of the plant or in other plants.
2. Whether operation is hand or machine, manual or power driven.
3. Whether runs are steady or intermittent.
4. Supply and disposal of material and product.
5. Steps in the operation (Give alternative methods of perception used with each step).
6. Sight required for operation; sight required for travel.
7. Physical demands of the job.
8. Working conditions for the particular operation; working conditions on the same operation in other parts of the plant if any.
9. Types of persons and personalities (Supervisors and fellow workers to be encountered by an operator on this job).
10. Production by the worker, relation of his production to that of others on the line; time allowed to reach full production.
11. Skills required (a) to be acquired before coming to the job (b) to be acquired on the job.
12. Set-up and maintenance (Give any equitable re-division of work that could be made in case some set-up or maintenance could not be done by the blind worker).
13. Existing combinations with other jobs or combinations which could be made on behalf of blind workers. Reasons for the combinations.
14. Combinations necessary to make a job possible for (a) totally blind and (b) partially sighted.

DETERMINATION OF A JOB POSSIBILITY

The determination of a job possibility comes through the summarization of the analysis of one or more positions by the methods and on the items mentioned in the foregoing part of this text. The analysis of any one position should vary only slightly whether found in large or small plants or whether runs are steady or intermittent.

Some generalization may be helpful to the person planning to make this type of job study. Usually in a larger plant there is less flexibility of procedure. The personnel and the activities of a large company have been carefully figured out and usually set on definite schedules from which lower ranks of supervision hesitate to digress.

The owner of a small plant is often his own superintendent and foreman, plans his own production, and decides quickly and easily on a complete change or slight deviation from a normal procedure. These conditions affect (a) the matter of getting the original survey of the job possibilities, (b) the facility with which an agreement can be secured on job possibilities, and (c) the ease of combining duties to make a complete safe margin on the job possibility. Just the planning alone of a large assembly line may cost the company several thousand dollars worth of time, and any deviation or variation might necessitate the same expense for complete replanning. On the other hand, if the owner of a small plant decides to make a change, there is very little time taken. He simply gives directions to his foreman or directly to the workmen, and the arrangement is tried out for a few days or a week and accepted or rejected.

Again in a large plant, what would normally be side-line operations may be full time due to the volume of business. An example of this was found in a can company making tin cans, where everything had been so mechanized that practically the only thing left was visual inspection on the main line of production. However, in the back corner of the plant there did exist an operation of making large paper bags in which the cans were to be shipped for local consumption. Two workers were detailed to this job year in and year out and allowed to divide up the tasks to suit themselves. Thus, one blind worker and one fully sighted worker placed on these two positions could divide up the duties to allow the blind person to do a share of work equal to that of the sighted worker.

APPENDIX A

Definitions of General Terms

Combination Employment: is an alignment of suitable jobs to which the blind workers may be changed from time to time in order to maintain full time employment as necessitated by regular short runs, fluctuations in quantity of production or variations in product produced.

D.O.T. Dictionary of Occupational Titles prepared by the Occupational Analysis Branch of the United States Employment Service.

Job: A piece of work done, or to be done, as a whole. A combination of tasks or operations normally performed as a whole.

Following is a quotation from the Training and Reference Manual for Job Analysis - WMC, June 1946:

"A job may be defined as a group of positions which are identical with respect to their major or significant tasks."

Job Analysis: Determination of the, what, how, why, and skill required for that which the worker is doing.

Operation: One of the steps performed, as a part of the job, which moves the product further through the process: for instance, the deburring of a piece of metal changes its status and moves it one step closer to being a finished product.

Orientation: Refers to the worker's ability to keep track of the location of things, such as controls on a machine, items on the bench, pathways, and materials stacked on the floor, the position of which he has once observed.

Position: A position may be defined as a job or combination job as it is being performed by a specific individual at a given time.

Following is a quotation from the Training and Reference Manual for Job Analysis - WMC, June 1946:

"Position is an aggregation of duties, tasks and responsibilities requiring the services of one individual."

Process: A series of jobs necessary to complete a product.

The following is a quotation from Funk & Wagnalls College Standard Dictionary:

"A course or method of operations, natural or artificial; a systematic series of operations in the production of something; as, a metallurgical process."

Task: Any action which is necessary in the process even though it may not advance the status of production of the item; for instance, moving material from one place to another may be necessary but does not change the production status of the item being processed.

Following is a quotation from the Training and Reference Manual for Job Analysis - WMC, June 1946:

"Task is created whenever human effort must be exerted for a specific purpose. The effort may be physical, as pulling and lifting, or mental, as planning and explaining. The effort may be exerted to change a material or merely to maintain the status quo of a material. The material may be tangible, as boards and nails, or intangible, as numbers and words."

HANDBOOK OF REPRESENTATIVE INDUSTRIAL JOBS FOR BLIND WORKERS

APPENDIX B

PHYSICAL DEMANDS FORM

Job Title _____ Occupational Code _____
 Dictionary Title _____
 Firm, Name & Address _____
 Industry _____ Industrial Code _____
 Branch _____ Department _____
 Company Officer _____ Analyst _____ Date _____

PHYSICAL ACTIVITIES	
1 Walking	16 Throwing
2 Jumping	17 Pushing
3 Running	18 Pulling
4 Balancing	19 Handling
5 Climbing	20 Fingering
6 Crawling	21 Feeling
7 Standing	22 Talking
8 Turning	23 Hearing
9 Stooping	24 Seeing
10 Crouching	25 Color Vision
11 Kneeling	26 Depth Perception
12 Sitting	27 Working Speed
13 Reaching	28
14 Lifting	29
15 Carrying	30

WORKING CONDITIONS	
51 Inside	66 Mechanical Hazards
52 Outside	67 Moving Objects
53 Hot	68 Cramped Quarters
54 Cold	69 High Places
55 Sudden Temp. Changes	70 Exposure to Burns
56 Humid	71 Electrical Hazards
57 Dry	72 Explosives
58 Wet	73 Radiant Energy
59 Dusty	74 Toxic Conditions
60 Dirty	75 Working With Others
61 Odors	76 Working Around Others
62 Noisy	77 Working Alone
63 Adequate Lighting	78
64 Adequate Ventilation	79
65 Vibration	80

DETAILS OF PHYSICAL ACTIVITIES:

APPENDIX C

Definitions of Physical Demands Terms

Physical Activities Terms and Working Conditions Terms

(Extracted from National Demands Information Series No. 2, page 102)

Definitions are included below for those items about which there might be some question or lack of understanding. Those items which are self-explanatory are not included. Parenthetical statements relative to the conditions for the blind have been added.

Physical Activities Terms:

4. Balancing: Walking, standing, or running on narrow, slippery, or elevated surfaces by maintaining body equilibrium to prevent falling.
5. Climbing: Ascending or descending ladders, stairs, scaffolding, ramps, poles, ropes, and the like, using the feet and legs or using hand or arms as well.
6. Crawling: Moving about on the hands and knees or hands and feet.
8. Turning: Twisting partly around from a stationary standing or sitting position, usually involving the spine, trunk, neck and legs.
9. Stooping: Bending the body downward and forward by bending the spine at the waist; not to be confused with Crouching.
10. Crouching: Bending the body downward and forward by bending the legs and spine; not to be confused with Stooping.
11. Kneeling: Bending the legs at the knees to come to rest on the knee or knees.

13. Reaching: Extending the hands and arms in any direction.
14. Lifting: Raising or lowering an object from one level to another; includes upward pulling.
15. Carrying: Transporting an object, usually by holding it in the hands and arms.
16. Throwing: Propelling an object through space by swinging motion of the hand and arm with or without the use of tongs or other devices.
17. Pushing: Exerting force upon an object so that the object moves away from the force, including slapping, striking, kicking, and treadle actions.
18. Pulling: Exerting force upon an object so that the object moves toward the force, including jerking.
19. Handling: Seizing, holding, grasping, turning or otherwise working with the hand or hands; not to be confused with Fingering.
20. Fingering: Picking, pinching, or otherwise working with the fingers primarily, (rather than with the whole hand or arm, as in Handling).
21. Feeling: Perceiving such attributes of objects as size, shape, temperature or texture, by means of receptors in the skin, typically those of the finger tips.
25. Color Vision: Perceiving the color of objects by sight.
26. Depth Perception: Perceiving relative or absolute distances of an object from the observer or from one object to another.
27. Working Speed: The rate of speed the job requires of the worker. This item is checked with an "X" only where the job requires a significantly high rate of working speed.

Working Conditions Terms:

51. Inside: Indoor protection from weather conditions.
52. Outside: Out of doors, or under an overhead covering with slight protection from the weather.
53. Hot: Temperature sufficiently high to cause perceptible bodily discomfort.
54. Cold: Temperature sufficiently low to cause perceptible bodily discomfort.
55. Sudden Temperature Changes: Variations in temperature which are sufficiently marked and abrupt to cause perceptible bodily re-actions.
56. Humid: Atmospheric conditions with moisture content sufficiently high to cause perceptible bodily discomfort.
57. Dry: Atmospheric conditions with moisture content sufficiently low to cause bodily discomfort.
58. Wet: Contact with water or other liquids.
59. Dusty: Air filled with small particles of any kind such as textile dust, flour, wood, leather, feathers, etc., and inorganic dust including silica and asbestos, which make the workplace unpleasant or are the source of occupational diseases.
60. Dirty: Contact with or exposure to dirt, litter, soiled materials, etc.
61. Odors: Perceptible smells, either toxic or nontoxic.
62. Noisy: Sufficient sound to cause thought distraction or possible injury to the sense of hearing. (For the blind - sufficient sound to interfere with conversation, obscure identifying noises of machinery, or prevent safe travel by the worker).

Working Conditions Terms:

63. Adequate Lighting: Sufficient lighting to minimize eye strain. (For the partially sighted - the proper character, quantity and location of light to eliminate eye strain due to worker's peculiar condition). (A zero before this item on the physical demands form indicates the lighting is either insufficient or excessive) (Explain under "Details of Working Conditions").
64. Adequate Ventilation: Sufficient ventilation to cause neither a feeling of suffocation nor exposure to drafts. (A zero before this item on the physical demands form indicates that the ventilation is insufficient or excessive).
65. Vibration: Production of an oscillating or quivering movement of the body or strain of the muscles, particularly of the legs and arms, as from repeated motion, pressure, or shock.
66. Mechanical Hazards: Exposure to materials or mechanical parts involving the risk of bodily injury.
67. Moving Objects: Exposure to moving equipment and objects such as overhead cranes, hand and motor driven vehicles, falling objects, etc., which involve the risk of bodily injury; also the act of operating such equipment.
68. Cramped Quarters: Workplace where freedom of movement is restricted or where worker cannot maintain an upright position.
69. High Places: Workplace at an elevation above the floor or ground level from which it is possible to fall and be injured.

Working Conditions Terms:

70. Exposure to Burns: Workplace involving the risk of being burned from hot materials or equipment, fire or chemical agents.
71. Electrical Hazards: Exposure to high tension wires, transformers, busbars, or other uninsulated or unshielded electrical equipment which involve the risk of electric shock.
72. Explosives: Exposure to explosive gases, vapors, dusts, liquids, and substances which involve the risk of bodily injury.
73. Radiant Energy: Exposure to radio-active substances (radium, uranium, thorium, etc.), x-rays, ultra-violet rays, or infra-red rays, which involve the risk of impairment of sight or general or localized disabling conditions.
74. Toxic Conditions: Exposure to toxic dusts, fumes, gases, vapors, mists, or liquids which cause general or localized disabling conditions as a result of inhalation or action on the skin.
75. Working with Others: Job requires occupational cooperation with fellow workers, or direct contact with the public.
76. Working Around Others: Job requires independent occupational effort but in proximity to fellow workers or the public.
77. Working Alone: Job requires independent occupational effort and virtually no contact with fellow workers or the public.

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